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**The OIL WEEKLY and The COMPOSITE CATALOG for the drilling-producing-pipe line industry**

**PETROLEUM-REFINER and The REFINERY CATALOG for the refining-natural gasoline industry**

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The **OIL WEEKLY**

ENGINEERING NEWS STATISTICS

R. L. DUDLEY, President, Publisher A. L. BURNS, General Manager

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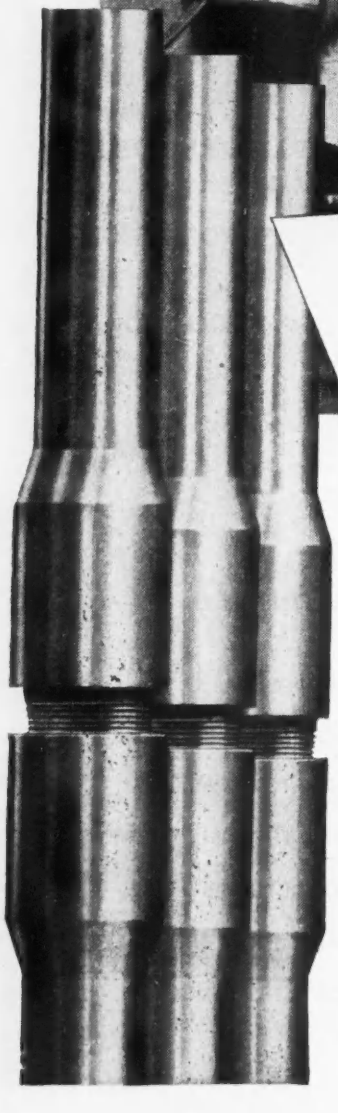

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## Engineering Graduates Sought by Employers

AS A HIGHLY technical, specialized, progressive, and large industry, the petroleum industry is and will continue an important competitor for the services of college graduates, who are in especially strong demand this graduation season. This year's graduates will equal or exceed the prewar peak of about 185,000 college graduates of 1940. They will be readily absorbed by employers long in need of college replacements with the youth and training for the competitive conditions ahead. Additional graduates will be welcomed in 1948 and subsequent years, although increased numbers of G. I. and other graduates will make for greater ease in getting men for jobs available.

Young men entering upon their college education would do well to take cognizance of several interesting and significant aspects of the present demand for college graduates. One of these is the special advantages held by technically trained students, including chemists, physicists, and engineers of all kinds, who are able to get larger starting salaries than non-technically trained graduates. This is not surprising in this age of technology and specialization. Another fact of significance is the very great demand for the technically educated students who have gone ahead to acquire doctor's degrees. In some cases, Ph.D.'s in engineering may command starting salaries virtually double those available to holders of only bachelor's degrees.

Among the non-technically trained graduates, those in greatest demand include salesmen—another indication of business preparation for competitive times. Other especially sought for graduates include accountants, credit men, and banking specialists.

Similar to the scouting of high schools for athletes by colleges, the nation's colleges now are scouted by many companies for promising engineering or business talent among the prospective graduates. Company representatives interview the students, and in reporting on them to those in charge of employing company personnel, they take into account such factors as personality, campus activities, scholastic records, and faculty recommendations.

In connection with their enlistment of new technically trained employees, many companies now have extensive training courses for the recruits, providing specialized training of as much as six months or more duration, with pay, before putting the employee into his starting job.

Oil companies are among those that are thus specially fitting men for technical jobs, and this practice may be expected to increase, for the oil industry must compete with the chemical, motor manufacturing, electrical manufacturing, and other industries for especially desirable technically trained employees.

## Industry Will Meet Consumer Oil Demand

THE "fix we're in" as regards world oil supply and demand is set forth rather vividly in the June issue of *The Lamp*, publication of Standard Oil Company (New Jersey).

New drilling programs, pipe line construction, refineries and various distribution facilities are included in the oil industry's current effort to meet postwar consumer needs for oil products, a demand considerably greater than could be anticipated from prewar trends.

Says *The Lamp*:

An average of about 5.2 million barrels a day is expected to be needed to satisfy this year's oil needs in the United States. That is 6 percent higher than the previous peak of 4.9 million barrels in 1946 and 7 percent above the maximum of any war year. By 1951, the nation's daily oil requirements are expected to rise about 6 million barrels, an increase of 23 percent over 1946. In addition to U. S. demand, some 400,000 barrels daily of crude and products are estimated to be needed for export in 1947 and 250,000 barrels in 1951.

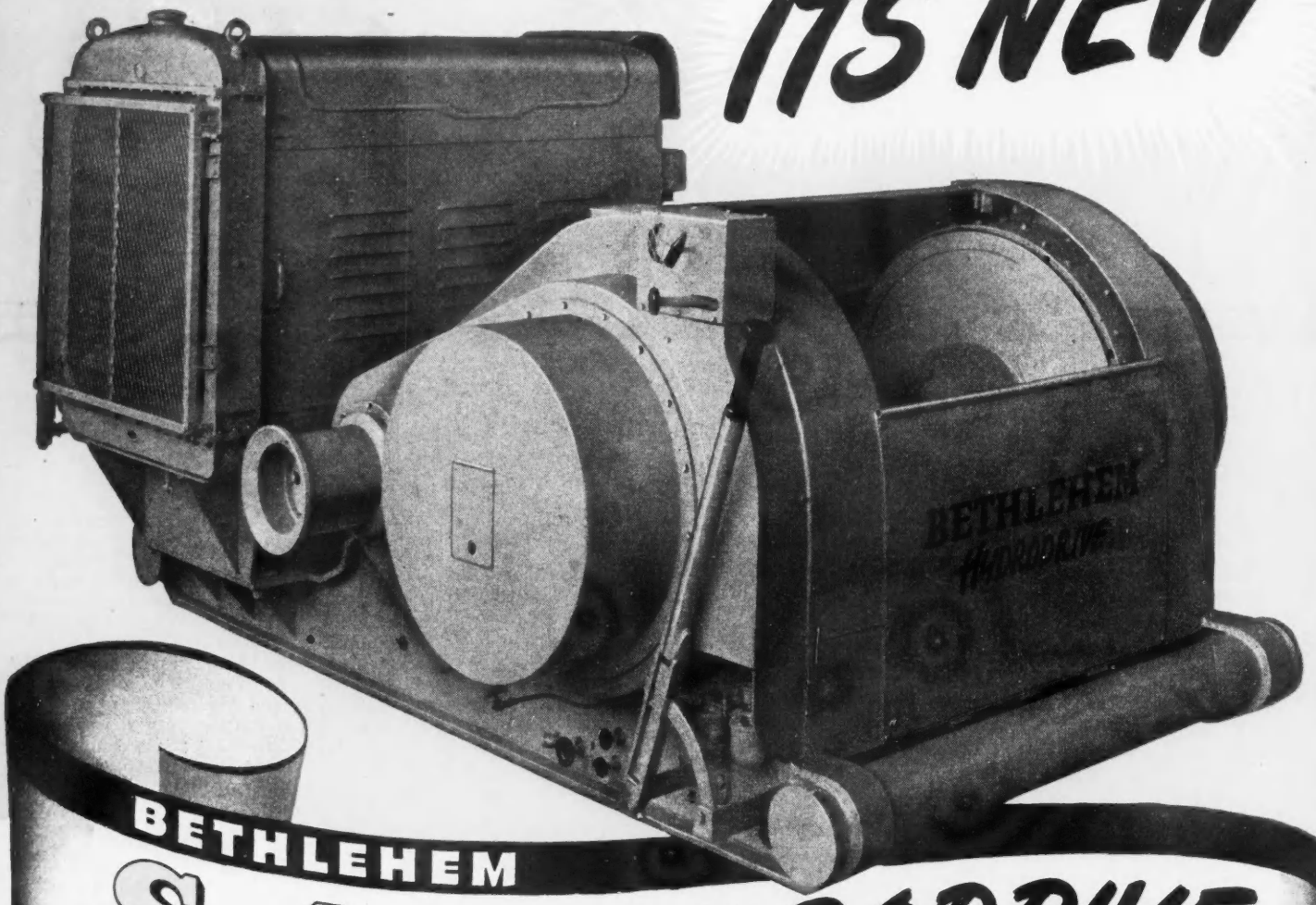
Efforts to supply the world's unexpectedly high oil needs are straining all the industry's facilities. There is more than enough oil in the ground, in the form of known reserves, to meet all requirements. The problem is to enlarge the facilities that produce crude oil, transport the oil to refineries, convert it to sufficient quantities of usable products and distribute those products to millions of customers.

Domestic petroleum needs have risen 28 percent since 1941. To meet those needs, the industry today must use pipelines, refining equipment, bulk plants and terminals, the capacities of which are not much larger than they were before the war. Wartime restrictions and subsequent shortages of both manpower and materials prevented even normal expansion of these facilities. Most of the plants and equipment constructed during the war were built to increase production of special products such as 100 octane aviation gasoline, synthetic rubber and toluene for TNT. Those facilities did not add substantially to peacetime capacities for civilian products.

All present estimates indicate the current expansion of petroleum's many and varied facilities will be the largest on record. For example, Jersey Standard is making the largest capital expenditures in the company's history. Before the war, such expenditures of Jersey and its affilites for expansion of facilities averaged about 170 million dollars a year. In 1946, these new capital expenditures jumped to 278 million dollars. This year's outlay is estimated to exceed 350 million dollars and budget studies indicate even larger capital outlays over the next few years.

The outcome? Careful planning and maximum effort by oil companies throughout the world, it is held, together with uninterrupted operations give every reason to believe that consumer needs for oil products will be met during this period.

# IT'S NEW

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# THE WEEK'S NEWS

SENATE Foreign Relations Committee hearings on the Anglo-American petroleum agreement develop that reservations fully protecting the domestic industry will be written into the treaty by the Senate and, if ratified, will be offered for acceptance by the British, with no treaty otherwise. Story below.

**Export Controls Decried**—Industry spokesmen urged that government export controls be allowed to die, charging that vital domestic operations were handicapped as a result of the administration's foreign policy. Page 24.

**Tanker Chartering Urged**—API urged continuance of Maritime Commission chartering of tankers, spelling out reasons for present shortages of ocean transportation capacity. Page 27.

**Five-Year Purchase Clause**—Stanolind is including a five-year purchase clause in its contract with operators in the Cap Rock field, New Mexico. Its new line will be that area's only outlet. Page 29.

**Arm's Length Gas Ruling**—Wording of the administrative rule which will exempt producers and gatherers of natural gas from the provisions of the Natural Gas Act was made public by FPC, but industry observers doubt it will be a satisfactory substitute for definite amendment of the act which is being sought. Page 27.

**Middle East Developments**—The "Red Line" was erased through an agreement reached last week and Gulf made a deal whereby Shell will purchase a considerable quantity of Kuwait oil for the Far East market. Page 28.

**Penn Grade Crude Group Meeting**—Officers were reelected at the annual meeting of the Pennsylvania Grade Crude Oil Association at Pittsburgh. Page 26.

**Would Extend Compact**—President Truman has asked a four-year extension of the Interstate Oil Compact, holding it to be a definite contribution to the conservation of oil and gas resources. Page 25.

**Wyoming-Texas Rulings**—A Supreme Court ruling gives Section 36 in Park County, Wyoming, back to the federal government. Court also has upheld the Texas Railroad Commission proration order for the Hawkins field. Page 25.

**Substitute for Natural Gas**—FPC has released two more installments of its staff report on the natural gas investigation, dealing with the eventual need for a substitute for natural gas and with its use in synthetic liquid fuel and chemicals.

**Petroleum Advisory Board**—Secretary Krug sets up industry-manned military advisory committee to aid Army-Navy Petroleum Board. Page 27

## Two Week Recess in Petroleum Pact Hearing; Will Draft Reservations

Aside from the repugnance of independent oil operators to any treaty whatever, a six-word phrase in Article VII developed last week to be the major stumbling block to approval of the Anglo-American petroleum agreement.

Those six words, industry spokesmen contend, pave the way for government invasion of the rights of the states to regulate the industry and make possible eventual federal control of domestic oil.

The six words provided that "with the exception of Article II" no provision in the agreement is to be construed as applying to the operation of the domestic oil industry. Article II, in turn, obligates the signatory government "to so direct their efforts * * * that the exploration for and development of petroleum resources, the construction and operation of refineries and other facilities, and the distribution of petroleum, shall not be hampered by restrictions inconsistent with the purposes of this agreement."

At the end of a week's hearings it had been decided that a two-week recess would be taken after the proponents have been heard, to enable the committee to draft reservations which it is hoped will cover every contingency, and that those reservations will be incorporated in the agreement when it is sent to the Senate and, after ratification, the British will be asked to accept them. Opponents of the agreement will be given an opportunity to testify when hearings are resumed.

Hardly had Under Secretary of State Dean Acheson, the first witness, launched his plea for quick ratification before members of the Senate Foreign Relations Committee wanted to know about the article. Acheson suggested that Charles B. Rayner, department petroleum adviser, respond, and not only Rayner but each government witness testifying was asked the same questions:

Why, if the reservations of the API, accepted by the State Department, were satisfactory to other elements in the industry, could not reservations be written that also were acceptable to the independents?

Why, if the treaty, as interpreted in the API reservations, gives the federal government no powers it now does not possess, is Article II necessary?

The API reservations, adopted by its board of directors last January 22 and accepted by Undersecretary William L. Clayton, declare, in brief, that nothing in the agreement is to be interpreted as giving the proposed international commission any power to regulate or control the foreign operations of American companies or the domestic petroleum business, or confer upon Congress any new or added power to regulate or control the domestic industry, or in any way provide for review or revision of foreign or domestic oil concessions and contracts of American nationals.

Acheson contended those reservations gave the domestic industry adequate protection.

Rayner, outlining the history of the agreement, declared that it should put an end to the "suspicion and mistrust" that have beclouded Anglo-American relations, particularly in the Middle East.

He emphasized that nothing in the agreement shall be construed as impairing or modifying the United States' import policy; that the functions of the international commission will be purely advisory and recommendatory, and that there is no requirement upon either government to act upon any report or proposal of the commission.

Charles Fahy, legal adviser to the State Department, disclosed that in the event of a controversy involving state laws it would be up to the courts to determine the application of the API reservations, although he said that the clear expressions of the intent of the treaty would "be of persuasive influence" before any court.

Fahy indicated that he felt the article would have little meaning so far as the United States was concerned, leading Senator H. Alexander Smith of New Jersey to inquire why the reservation in Article VII should not be dropped.

Glenn McCarthy, president of the McCarthy Oil and Gas Corporation, Houston, and Commissioners Olin Culberson and William J. Murray of the Railroad Commission, assailed the pact.

McCarthy charged that government spokesmen who declared the new agreement had been shorn of the oppressive provisions of its predecessor were deceiving the industry, and referred to the August, 1946, broadcast of John A. Loftus, chief of the State Department petroleum division, and Rayner as expressing the real purpose of developing a world-wide agreement which might come under the control of the United Nations Organization.

"If the oil industry must be regulated by the federal government, or through an international commission composed of the British, the Russians and other signatory powers, composed of men whose ideas of economy, society and

politics may be diametrically opposed to ours, then the independent oil industry wants no part of it," he said.

"This government has no right to sponsor, by treaty or otherwise, the development of those foreign oil reserves which may be easily captured and used against us in the event of war, while at the same time discouraging and stifling that segment of the domestic oil industry which constitutes our greatest weapon of defense."

Culberson alleged that the treaty would lead to control of exports and imports, establish an oil cartel and develop monopoly and federal control of American business, all to the detriment of the states.

Also, he said, eliminate Article II "and the people who are pushing the treaty won't want it."

Governor Beauford Jester, Murray said, fears the treaty would destroy the states' exclusive power to regulate the oil and gas business, and has found the industry also fearful of increased federal authority over it.

William R. Boyd, Jr., president of API, said "nobody in the industry is more opposed to federal control, but when this treaty came up it seemed to me if there was some way in which our government could help our nationals in foreign countries it would be of some help, but I want to be sure nothing interferes with the domestic industry."

Former Deputy Administrator Ralph K. Davies reminded the committee that the present draft was discussed with it before it was taken to London for discussion with the British, at which time, he said, "we did go away from the meeting encouraged in the belief that if successful in getting the British to accept the document substantially as written, it would be favorably received here."

The only change of consequence made in London, he said, was the elimination of a clause providing for an invitation to all nations to participate in the negotiations, which was deleted at the insistence of the British.

"The agreement has overwhelming acceptance in the oil industry and the full support of the governmental agencies and it is now opposed only by those who are ill-informed or those who have private axes to grind," he declared. "Principal opposition comes from a single major, Sinclair Oil Company. Mr. Sinclair has declined to make his objections known. He declined to work with us."

Acceptance of Article II and the reservation in Article VII, Davies said, was a victory for the American delegation. It is not aimed at the domestic industry, which operates in open competition, but at the British who, by tariffs and other devices, have sought to bar American oil companies from many areas. He indicated he could see no situation arising in this country which would require application of the article, but contended it would go far to help American companies operating in British territory.

Davies pointed out that the treaty can be canceled on 90 days' notice by either party, making it possible quickly to abrogate it if it was found to be detrimental to American interests.

George A. Hill, Jr., president of Houston Oil Company, who authored the resolutions of the API and IPAA denouncing the first draft and the approving resolutions following the revision, as well as the reservations adopted by the API, said he felt its questions had not been satisfactorily answered by government witnesses.

He made it clear that he was "allergic" to anything that might alter the present division of power between the states and the federal government, and emphasized that, in his view, nothing in the treaty would affect the present structure.

Hill insisted that the reservations must be adopted and that any existing uncertainties should be cleared up by additional reservations so that no room would be left for new constructions of the treaty at a later date.

The committee contemplates that all reservations felt necessary to clarify the agreement are to be included in the treaty as sent to the Senate and, upon ratification, the British are to be asked to acquiesce. Vandenberg also asked that Hill submit any further reservations he thinks necessary.

Hill said Article II would impose no new responsibilities upon this country, but emphasized, however, that it is the very heart of the agreement and said its excision would mean the loss of the main objectives of obtaining equal opportunity for our nationals abroad.

Questioned by Vandenburg and Hatch as to whether equal opportunity meant free trade, as they suggested Davies' answer to the same question indicated, Hill let out an emphatic "no."

The main difference between the two witnesses was over the question whether the imposition by Congress of tariffs or quotas on imported oil would be contrary to the principles of the agreement. Davies said it would, but Hill declared the way had been left open by a provision in Article VII affirming the right of the signatory governments to act freely with respect to imports into their respective countries.

"Everybody else is agreed as to what we are willing appropriately to do, yet there is total disagreement among them whether the language of the treaty or the language of the reservations achieves that result," Vandenburg commented, again raising the question why it was not possible to write reservations that would satisfy all interests.

Following Hill, the committee heard Joseph E. Pogue, vice president of Chase National Bank, support the agreement, although he admitted it was not well drafted. He explained that his doubts set in after the Loftus-Rayner broadcast, which Vandenberg indicated the committee would go into.

J. E. McDonald, Texas' Commissioner of Agriculture, took the position that the agreement would precipitate an oil cartel and invasion of state rights through a federal bureau which he said would develop.

At the final session of the week, Eugene Holman, president of Standard Oil Company (New Jersey), testified

# Extension of President's Control Of Exports Opposed by the Industry

Oil and gas industry spokesmen last week urged that Congress deny President Truman's request for extension of his export control authority after June 30, declaring that heavy and steadily increasing exports of pipe were creating shortages in this country which prevented both industries from providing new facilities required by expanding demand.

Russell B. Brown, general counsel of the Independent Petroleum Association of America, told a Senate Judiciary subcommittee that since the end of the war the State Department has encouraged development of oil in all parts of the world except the United States and declared that "to say that the State Department would be given the power to limit the use of oil country tubular goods or other materials and direct that they be sent to the Middle East or South America or even Russia, under the general authority to carry out the 'foreign policy' of the United States cannot fail to bring apprehension to all aware of the petroleum philosophy of the State Department."

John A. Ferguson, executive director of the Independent Natural Gas Association of America, said that construction of well over 5000 miles of pipe line requiring more than 1 million tons of steel has been held up because of inability to obtain pipe, and applications now pending before the Federal Power Commission, when granted will involve the construction of another 10,800 miles of line calling for 2 million tons of steel. This, he pointed out, does not include the steel needed for compressor stations and other facilities, nor tonnage required for drilling gas wells and producing gas and the laying of mains and extensions by distributing companies to serve individual consumers.

This shortage of steel is not a potent argument for the continuation of export controls, Ferguson said, although it might so appear on its face.

"The steel mills and other distributors of steel products have not and probably will not complain that they feel it necessary to make extraordinary efforts to satisfy the export requirements of foreign countries which the State Department suggests as a very desirable thing to do," he said. "In business circles it is generally recognized, however, that this is the case.

"We believe that the elimination of all controls which have resulted in commodities, particularly steel, needed in our industry, going abroad, should be removed, and American businessmen be afforded an opportunity to conduct their affairs under long established open markets and private negotiations."

that the agreement advocates the development of the international oil trade by private business under the competitive system, and warned that in the absence of such an agreement "the present trend in various areas toward nationalization might be accelerated."

Holman said there was a large field of study which would be open to the international commission, including the present two-pronged trend toward oil from coal as a prime source of energy and the shift from the Caribbean to the Middle East as a source of supply for Europe. Another subject to which study might be devoted, he said, is that of tankers.

Holman refused to say that he considered the treaty necessary to the doing of business abroad; he maintained it was "desirable." He agreed with Senator Connally that the industry would continue to operate abroad if there is no treaty, but denied that it was a case, as the Senator suggested, of "our companies and Great Britain will be together and work out a little NRA and have a sort of fair practice between the two."

Holman agreed that it would be desired to see how the present two-nation agreement works out before consideration is given to the proposed multilateral pact.

Questioned regarding future domestic oil supplies, Holman said he belonged to the "school of plenty" as contrasted with the "school of scarcity" and expressed the belief that the country "never will run out of liquid fuel" because of the many sources from which it may be produced.

Warwick M. Downing, Denver attorney and independent producer, and Ghent Sanderford, Austin, Texas, assailed the agreement as threatening the existence of the independent operators.

Both took the position that the agreement is aimed at permitting the entry into this market of a flood of cheap flush oil from the Middle East, and Downing asserted the first step in an American oil policy should be a law prorating imports.

Sanderford said he had been informed that a "former" Secretary of the Interior had prepared and was seeking to have introduced legislation setting up a federal oil commission in the Interior Department which would take over the rights now exercised by the states.

## Trio Acquires Stock of Beacon Oil & Refining

Capital stock of Beacon Oil & Refining Company, which controls eight operating companies in the East Texas field, was acquired May 31 by Joe A. Humphrey, Al. H. Meadows, president of General American Oil Company of Texas, and Sol Brachman for $5 million.

The properties involve full and part working interest in 45 leases with 114 wells on 400 acres. The current allowable is about 1500 barrels daily. The operating companies include: Bromley Oil Company, Delano Oil Company, Falls Refining Company, Octo Oil Company, Pine Petroleum Company, Theron Oil Company, Unus Oil Company and Tres Oil Company. The purchasers are negotiating for re-sale of the properties.

# Wyoming Title to Federal Government; Hawkins Field Proration Order Upheld

The Supreme Court last week held that lands in Section 36, Township 58, Park County, Wyoming, leased to The Ohio Oil Company, are federal property, but sent the matter back to the master for a determination of the company's good faith in leasing and operating the land and a finding whether the government should recover from the company the value of oil produced, and from the state all royalties paid.

The oil company and the state contended that regardless of the rule generally applicable in school-grant cases, the provisions of the Wyoming Enabling Act were such that upon its admission in 1890 it received an indefeasible proprietary interest in the school-land sections in each township, whether or not surveyed. The master recommended, and the court rendered, a decree quieting the government's title to the land.

Under a lease from the state, The Ohio Oil Company in 1917 entered the land and drilled five wells, some of which are in production. While the government offered evidence tending to show that the defendants knew of its claim to the land and therefore trespassed in "bad faith," the master did not go into the matter and held that the defendants sincerely believed in their asserted rights and therefore acted in good faith, concluding that the government's recovery should be measured by the gross proceeds realized on the operation, less the proper expenses incurred. The master found that the total amount of the company's gross proceeds was $168,317 and its total expenses were $232,797, including $17,306 paid in royalties, and as expenses were some $47,000 greater than gross proceeds the Government should recover nothing.

In another case, the court affirmed judgments upholding the validity of proration orders of the Texas Railroad Commission, which had been challenged by Humble Oil & Refining Company, and Floy K. Williams, et al., royalty owners.

The cases were brought against Rule 15 formulated for the Hawkins Field in Wood County, assigning the proration unit as 20 acres but allowing the drilling of 87 wells on 74 acres in the town area which comprises part of the field, since it was broken into small lots and blocks.

The company contended that the townsite wells which ordinarily should produce only 1.5 percent of recoverable oil are now allowed to produce 9.3 percent, thereby draining oil from nearby tracts and its property.

## York Sells Properties

R. L. York, Midland, Texas, operator, has sold his joint interest properties held with York & Harper, Inc., and Sloan and Zook Company in three West Texas fields to the latter two firms for approximately $1 million. The properties involve 97 wells in the Wasson, Foster and Harper fields.

York and O. C. Harner, president organized the York & Harper, Inc., firm in 1934, and the Sloan and Zook Company acquired an interest in the properties in 1936.

## API to Award Annual Certificates of Merit

The American Petroleum Institute's new series of awards, designed to honor outstanding oil men for their contributions to the arts and sciences includes three in the Division of Production.

Certificates of merit will be awarded annually to those who have rendered outstanding and extraordinary services as an officer or member of a division, committee or other organized unit of the Institute.

Eight certificates may be presented each year; one each in the divisions of refining, transportation and marketing, two in the non-divisional committees and three for the division of production. These are in proportion to the numbers of persons serving in the various categories.

Five award committees are to select candidates for the awards, transmit their recommendations to the president of the Institute, who will, in turn, pass them along to the Committee on Awards, together with his comments. That committee will then make final selections and inform the president of their findings before October 1, each year. Presentations will be made at the annual meeting of the Institute.

The certificates of merit will be awarded in addition to the Institute's gold medal for distinguished achievement presented annually for outstanding contributions directly or indirectly to the petroleum industry. Last year's gold medal winner was the late Henry Ford.

## Wheeler Resigns

President Truman last week signed a Senate resolution authorizing the Senate War Investigating Committee to employ former Senator Burton K. Wheeler as special counsel in the Arabian American Oil Company investigation, but shortly before he did so Wheeler resigned.

Committee Chairman Owen Brewster said that the resolution had been written specifically to permit Wheeler's employment, and it was not intended to employ a successor.

## Compact Extension

A four-year extension of the Interstate Oil Compact was recommended to Congress June 2 by President Truman, and within an hour measures to that end were introduced by Senator Carl A. Hatch of New Mexico and Representative Glen D. Johnson of Oklahoma.

"The increasing membership of this compact is especially encouraging at this time, in view of the necessity for the conservation of our resources of oil and gas," the President pointed out.

# Penn Grade Crude Group Officials Re-Elected; Increased Output Likely

New oil fields will be found in the Pennsylvania grade crude oil region, its boundaries will be extended, and its 1947 crude output will exceed 1946's, Dewitt T. Ring, Columbus, Ohio, predicted in the president's address to Pennsylvania Grade Crude Oil Association in its 23rd annual meeting last week in Pittsburgh.

At the convention dinner Walter S. Hallanan, chairman, National Petroleum Council, said the oil industry has no reserve capacity to meet emergency demands of another war and called upon the industry for full cooperation with government in solving this "great national problem."

Claiming oildom's wartime performance was the product of years of careful preparation, Hallanan credited its success to a political climate of freedom, rewarding incentive and accomplishment. He forecast a record drilling program this year, saying only tubular and other steel material shortage will interfere. Citing shipments of 50,000 tons of pipe and related material to Russia in the last 20 months, he decried, watering "roots of communism at same time we are clipping branches," calling it folly to build up war-making potentials of Europe at the expense of neglecting our own security.

The industry's public relations program was indorsed by the directors.

### Secondary Recovery Research

Recovery of billions of barrels of crude oil beyond the reach of known producing methods hinges on future discovery of a radically new technique, Dr. Richard V. Hughes of Bradford, Pa., association director of production research, said in a paper, *Recent Developments in Secondary Recovery Research.*

He urged oil men to take a broad view of research in secondary recovery, most of which currently, is aimed at practical problems. The broad view, he explained, would save from discard some ideas which at first glance might seem impractical but which ultimately might be of considerable value.

Hughes reviewed accomplishments of the association's production research program. He rated as highly important the part that the clay content of oil sands plays in secondary recovery operations. Because of the clay factor, he said, there is reason to believe that slightly acidic waters and natural brines would be more suitable than fresh waters for use as an oil drive medium in flooding oil-bearing sands.

Bacteria have released oil in the association's laboratory, but only in small quantities. To the best of his knowledge, no bacteria have been introduced knowingly into oil wells.

Reviewing the varied aspects of the association's production research studies, the director said the association has maintained the general policy of assigning specific projects to educational institutions and private concerns when best results could be achieved that way. A research grant is being continued at the Pennsylvania State College, he reported, where studies will be pushed in selective plugging of oil sands by smokes in operations using air and gas for repressuring; and in the influence of capillary effects in water flooding.

The Association, he said, also is furnishing cooperative funds to the U. S. Bureau of Mines Franklin station for research in flowing of oil wells, and is underwriting statistical studies by Ryder-Scott Company, Bradford, Pa., in connection with water flooding.

*The Future of Oil in West Virginia* was discussed by Paul H. Price, R. C. Tucker and James H. C. Martens of the West Virginia Geological Survey. Their paper summarized the production of West Virginia and used this basis as foundation whereon to outline the trend of future oil development in the state. Present figures for reserves do not take into account the probable recoveries which will be possible when water flooding becomes an accepted method for recovering oil in the state, they said. At least 80 percent of the oil in the known oil fields of the state still remains in the ground, due largely to uneconomic development and production methods. Before water flooding can be adopted it must be legalized by state law, and methods must be worked out for the necessary unitization of areas to include whole fields, or at least workable sections within proven areas. Detailed technical studies of individual pools is a prerequisite to successful secondary recovery.

The authors showed that many zones, productive or potentially so, may have been passed up in the earlier development of the state's oil resources, citing as evidence the producers obtained when relatively tight sands were properly shot.

### Armour Research Foundation

Three distinct methods have been developed to determine from what crude an oil originated, reported Thomas C. Poulter, associate director of Armour Research Foundation. The infrared method will identify an oil of Pennsylvania origin, whether it is pure or in a mixture with any one or all the other crudes Poulter stated.

Oil of Pennsylvania origin can also be identified and differentiated from oils from other crudes by the refractivity intercept method. The solidification pressure method will identify any one of the three crudes and detect the presence of as little as five percent of any of the other oils in a mixture with an oil of Pennsylvania origin.

In his paper which outlined some of the foundation's activities, the assistant director told of another interesting discovery, which, according to him, will eliminate drilling costly shot holes in geophysical exploration. This discovery resulted from a war project in the development of a small bomb which would take advantage of the Munroe effect to obtain increased penetrating power. Tests have been completed in which some of these bombs were used for making seismic measurements such as are employed in geophysical exploration for oil.

## Penn Grade Officers

Officers reelected by the Pennsylvania Grade Crude Oil Association board of directors included D. T. Ring of Preston Oil Company, Columbus, Ohio, president; B. T. Haskins of Ebenezer Oil Company, Wellsville, N. Y., first vice president; George J. Hanks, president of South Penn Oil Company, Bradford, Pa., second vice president; Fayette B. Dow of Washington, D. C., vice president and general counsel; Samuel Messer of Quaker State Oil Refining Corporation, Oil City, treasurer; assistant treasurers—W. R. Reitz, of Quaker State Oil Refining Corporation, and C. L. Suhr of the Pennzoil Company, both of Oil City; and W. C. Wenzel of Oil City, executive manager.

New directors are as follows: D. S. Keenan, Carnegie Natural Gas Company, Pittsburgh; N. V. V. Munson, Franchot Estate, Olean, N. Y.; W. R. Reitz, Quaker State Oil Refining Corporation, Oil City; A. J. Saxe and John E. Selden, South Penn Oil Company, Bradford, and W. S. Zehrung, Pennzoil Company, Oil City.

## *West Edmond Unitization Argued Before Commission*

Irreparable damage already has been done to the Hunton lime reservoir of the four-county West Edmond field of Oklahoma, E. O. Bennett, consulting engineer of Houston, told members of the Oklahoma Corporation Commission at Oklahoma City, during hearing on application for unitization of the big field. Bennett said that unit operation is the only means now of increasing ultimate recovery.

As an example of the inefficient operation he cited that since the commission hearing started on March 17, there has been dissipated enough gas energy to produce 18 million barrels of oil and that the dissipation continues.

Estimated gas production in the field is 240 million feet daily, and of this amount some 150 million feet are utilized.

## World's Deepest

Crews were drilling ahead below 17,729 feet on June 6 at the world's deepest test, Superior Oil Company of California's Weller 51-11, NW NW NE 11-8n-12w, in Caddo County, Oklahoma.

Earlier in the week minor fishing jobs were necessitated when cones were lost at 17,711 feet. Junk basket recovered the fish and crews made 18 feet of hole in the last 24 hours.

# FPC's Arm's Length Rule Detailed For Comment Before Actual Adoption

A formal rule exempting from the provisions of the Natural Gas Act all persons who merely produce or gather natural gas for sale at arm's length to others who transport it in interstate commerce has been offered by the Federal Power Commission for comment prior to its adoption.

The rule, long promised, already has been applied in several cases.

The rule does not offer a flat decision but is merely an "opinion." Natural gas industry spokesmen appearing before congressional committee in connection with the Rizley bill dealt with that point, taking the position that any rule adopted by the FPC would be subject to reversal or modification by a future commission.

"The commission is of the opinon that the exemption contained in Section 1 (b) of the Natural Gas Act, to the effect that the provisions of the Act shall not apply to the 'production or gathering' of natural gas, was intended by Congress to exempt from the jurisdiction of the commission all activities in producing and gathering natural gas—including sales made at arm's length—by those who only produce, gather or process natural gas exclusive of its transportation and subsequent sale in interstate commerce," the rule holds.

This opinion was accompanied by definitions as follows:

"*Production* means the extraction of natural gas from wells or reservoirs and the recovery of residue gas from natural gas or casinghead (oil-well) gas by the removal of natural gasoline, propane, butane, or other hydrocarbons, and includes the arm's length sale of such natural or residue gas by the producer to a gatherer or transporter.

"*Gathering* means the collecting of natural gas from wells of the gatherer or of other producers, its movement to central points by means of pipe lines and other facilities used in connection therewith, its processing and compression as a part of gathering, and includes the arm's length sale and delivery of such natural gas by the gatherer, prior to the beginning of transportation in interstate commerce within the meaning of the Act.

"As distinguished from gathering, *transportation* means the movement of natural gas, after its gathering, through pipe lines and related facilities transmitting natural gas in interstate commerce to the point or points of local distribution for ultimate public consumption, or, after the completion of gathering, to the point or points at which such gas is sold in interstate commerce for resale."

The commission pointed out that as regards some complex situations, appropriate distinctions between gathering and transportation cannot always be prescribed by mere definitions.

## Coup in Hungary Likely Not to Affect Production

The recent coup whereby Hungary has gone 100 percent communistic politically is not expected to have any immediate effect on the situation confronting foreign oil operators in that nation. Operators there are still producing crude under the direction of government agencies which specify the amounts desired from each field, and its disposition. The political situation now indicates, according to observers, that such dictated operations will continue for a longer period than had been hoped for.

Until such time as a formal treaty is signed, the area will remain pretty well under the control of the military occupying forces, and production will continue to move as part payment of reparations.

Recently the Russian military was moved from the fields, and company engineers have been able to produce the properties in as efficient a manner as possible considering the rates at which production is desired.

### Crude Oil Production in the United States

(Estimates compiled by THE OIL WEEKLY. All figures indicate daily averages in barrels.)

| STATE OR DISTRICT | PRODUCTION IN WEEK ENDED June 7 | May 31 |
|---|---|---|
| Alabama | 1,150 | 1,050 |
| Arkansas | 74,500 | 74,500 |
| California | 918,200 | 920,700 |
| Colorado | 40,000 | 39,750 |
| Florida | 660 | 1,160 |
| Illinois | 188,000 | 188,400 |
| Indiana | 17,850 | 17,700 |
| Kansas | 264,900 | 291,500 |
| Kentucky | 25,650 | 25,750 |
| Louisiana | 418,900 | 413,800 |
| North Louisiana | 97,500 | 97,800 |
| South Louisiana | 321,400 | 316,000 |
| Michigan | 39,000 | 45,500 |
| Mississippi | 95,200 | 93,950 |
| Missouri | 100 | 100 |
| Montana | 22,600 | 22,600 |
| Nebraska | 600 | 600 |
| New Mexico | 106,450 | 105,850 |
| New York | 13,400 | 13,200 |
| Ohio | 9,500 | 8,500 |
| Oklahoma | 389,200 | 388,900 |
| Pennsylvania | 35,400 | 34,800 |
| Tennessee | 25 | 25 |
| Texas | 2,288,950 | 2,226,850 |
| **Tex. R. R. Comm. Districts:** | | |
| Dist. 1—South Central | 21,650 | 21,100 |
| Dist. 2—Middle Gulf Coast | 166,550 | 159,160 |
| Dist. 3—Upper Gulf Coast | 494,475 | 485,170 |
| Dist. 4—Lower Gulf-S.W. | 247,725 | 243,420 |
| Dist. 5—East Central | 39,950 | 38,360 |
| Dist. 6—East Texas Field | 334,000 | 338,000 |
| Dist. 6—Rest of Northeast | 116,100 | 112,500 |
| Dist. 7-B—North Central | 39,500 | 38,200 |
| Dist. 7-C—West Central | 39,000 | 36,790 |
| Dist. 8—West | 560,750 | 530,130 |
| Dist. 9—North | 141,500 | 137,800 |
| Dist. 10—Panhandle | 87,750 | 86,220 |
| Virginia | 200 | 200 |
| West Virginia | 7,800 | 7,500 |
| Wyoming | 116,250 | 116,500 |
| Total United States | 5,074,485 | 5,037,385 |

Total stocks, foreign and domestic, May 31, as reported by the Bureau of Mines were 239,370,000 barrels.

## Petroleum Group Named To Advise With Military

Representatives of the oil and gas industries have been appointed by Secretary of the Interior J. A. Krug to a Military Petroleum Advisory Committee set up to counsel the Army-Navy Petroleum Board and the Oil and Gas Division on matters relating to national security and defense.

Krug announced the committee was created under the President's letter of May 6, 1941, calling for the unification and coordination of Federal oil policy after consultation with the ANPB.

Named as members were: Paul G. Benedum, Hiawatha Oil and Gas Company, Pittsburgh; T. E. Buchanan, The Texas Company, New York; Stewart P. Coleman, Standard Oil Company (New Jersey), New York; E. L. DeGolyer, DeGolyer and MacNaughton, Dallas; J. Terry Duce, Arabian American Oil Company, Washington; R. G. Follis, Standard Oil Company of California, San Francisco; B. I. Graves, Tide Water Associated Oil Company, New York; George A. Wilson, Interstate Natural Gas Company, Baton Rouge; D. B. Hodges, Shell Oil Company, Inc., New York; B. L. Majewski, Deep Rock Oil Company, Chicago; R. L. Minckler, General Petroleum Corporation of California, Los Angeles; J. Howard Marshall, Ashland Oil and Refining Company, Ashland, Ky.; J. R. Parten, Woodley Petroleum Company, Houston; E. E. Pyles, Los Angeles; Bruce K. Brown, Standard Oil Company (Indiana), Chicago. Charles L. Harding, Socony-Vacuum Oil Company, New York, was designated legal adviser.

The committee will hold its first meeting at the ANPB offices June 16.

## Boyd Asks Extension of Tanker Chartering Plan

Continuation of the present Maritime Commission plan of chartering tankers until a workable reconversion program can be developed was urged by the American Petroleum Institute last week in a letter sent by President William R. Boyd, Jr., to all members of Congress.

Approximately 25 percent of all oil moving throughout the world is being carried in government tankers operated by the commission, which are delivering in excess of 1 million barrels of crude and products daily, and this movement will cease June 30 unless Congress takes action to authorize its continuance.

"It appears certain that the withdrawal of 25 percent of world tanker tonnage from service will result in shortages in coastal areas of the United States and especially in the northeastern states," he said.

Boyd inclosed a copy of a memorandum from B. Brewster Jennings, API vice president for transportation, in which he explained there are not enough privately-owned tankers world-wide to provide the transportation of oil required in consuming areas and that, even with the government ships now in use, the tonnage is barely sufficient.

# Basis for New Iraq Petroleum Pact Agreed Upon; Upped Production Seen

Major participants in Iraq Petroleum Company have reached an agreement which would pave the way for final consummation of the deal whereby Standard Oil Company (New Jersey) and Socony Vacuum Oil Company would acquire substantial interests in Middle East oil resources. Still blocking the final wind up of details is the failure of major partners to get the consent of C. S. Gulbenkian, holder of a 5-percent interest in the company.

The new pact would eliminate previous restrictions against independent activity on the part of any of the participants within the area, thus erasing the Red Line.

Gulbenkian, 80, resides in Lisbon, Portugal, and it is possible that he could be planning complete retirement from his connection with Iraq Petroleum Company on the basis of perhaps a cash settlement for his interest. The 5-percent interest was received for his participation in acquiring original concessions.

As for Compagnie Francaise des Petroles, it is understood that basically it was concerned as much over the possibility of acquiring assured supplies of petroleum as upon holding other partners to the agreement regarding further individual expansion in the area. This supply is sorely needed by the French for rehabilitation and industrialization, and their principal objections were believed removed with the basic agreement that the partners would obtain crude from the company in accordance with their needs rather than in fixed proportion to the total production. The Iraq company believes that the earliest date at which any substantial increase in production can be assured will be some time in 1952.

Meanwhile, there is no change in the status of the proposed acquisition of stock in the Arabian American Oil Company by Standard Oil Company (New Jersey) and Socony Vacuum Oil Company.

## Jersey Standard Clarifies Persian Crude Situation

Standard Oil Company (New Jersey) has no present plans for importing crude oil from the Middle East into the United States, the company has announced in an effort to clarify published reports that Persian Gulf crude oil soon would be moving to its East Coast refineries to meet temporary needs.

Because of the world-wide tightness in crude oil supply, it was pointed out, the company had discussed with some Persian Gulf oil producers the spot purchase of crude, if available, for supplying foreign markets.

"At best only a small amount of crude oil would be available above present commitments of producers in the Middle East," the company explained. "Expansion of production there depends upon new facilities which cannot be completed for some time."

## NEI Oil Exports Reach 200,000 Barrels Monthly

Exports of crude oil and refined products from Netherlands East Indies are averaging about 200,000 barrels a month, with Java and Madoera not participating. About half of this quantity is going to Singapore and the remainder to Hong Kong and other Asiatic destinations. At present no oil is being exported to Holland.

The monthly output from Tarakan is about 117,000 barrels as against 425,000 barrels in 1941. At Balik Papan construction of the new refinery has commenced, but this is not expected to be completed for some time, and a small emergency plant is in current use, whose throughput is 70,000 barrels a month as against 500,000 barrels monthly in 1941. Rehabilitation work is afoot on the damaged fields of Pladjoe and Soengei Gerong in Sumatra and also in New Guinea.

## Pemex Trims Expenses

Petroleos Mexicanos, government-controlled oil company, has been successful in cutting both wages and staff slightly, General Manager Antonio Bermudez has announced. Bermudez sought a 5 percent dismissal of union workers and 10 percent from the office staff with some wage reductions and other restrictions. This plan was accepted generally by a joint commission from both sides and later was agreed upon by the unions after the company had made slight concessions.

## Punjab Pipe Line Outlet To Refinery Is Delayed

Because of present delays on the railways, the 35-mile pipe line designed to connect the new field at Balkassar with the Rawalpindi refinery, in the Punjab, India, will not be completed before the end of this year. The disturbed conditions in North India have also delayed construction.

The second well at Balkassar has found water at 4560 feet. Drilling has been stopped to allow the water to flow, this in hope it will make drilling easier through it to the 8000-foot oil horizon at other locations in the area.

At Joya Mair No. 3, the oil show at 8412 feet has been tested but production has not been proved. Total output from all fields this year is stated to be at a slightly higher level than 1945. Prospecting on a large scale has been carried out, and further prospecting licenses have been acquired.

Although there has been serious rioting in the Punjab, no damage has so far been done to any Attock Oil Company property.

## Shell To Purchase Gulf Kuwait Crude

Announcement has been made by Gulf Exploration Company, through its president J. F. Drake, that a long-term agreement has been signed between Gulf and Shell Petroleum Company, Ltd., under which Shell will purchase increasing amounts of crude produced in the Persian Gulf area by Gulf interests. The crude is to be produced from the Shaikhdom of Kuwait, and furnishes one the first important outlets for the Gulf interests. No amount has been specified as the volume of crude concerned in the contract, but it is believed to be considerable, since it will furnish an important part of Shell's supply.

Shell had been purchasing Kuwait crude from Gulf for some time on a month-to-month basis, this to supply its Far East markets.

Kuwait Oil Company, Limited, operator of the field, is jointly owned by Gulf Exploration Company, a subsidiary of Gulf Oil Corporation, and by Anglo-Iranian Oil Company, Ltd. A feature of the agreement, is that each principal may market oil to be produced by the company independently of the other. Each may establish markets and produce for those markets for its own account without charging back withdrawals against reserve.

With announcement of the purchase of Middle East crude from Anglo-Iranian by Standard Oil Company (New Jersey) and by Socony Vacuum Oil Company with the probability that part of this might be supplied from Kuwait through construction of a comparatively short pipe line, came realization that the Gulf interests did not necessarily participate in any of this outlet, although it is possible that sales might be made for the joint account of the partners.

* * *

Thirty-three production men of the Gulf Oil Company left New York last week via Pan American World Airways' clipper for Basra, Iraq.

All from the Texas and Oklahoma oil fields, the men are drillers and riggers and will supervise the work of local personnel at the Gulf holdings at Kuwait.

## Russians Report Gas Find In Northern Caucasus

As a result of Russian geological investigation in the northern Caucasus, a gas field has been found near Lake Sengilej. Large-scale geological and geophysical investigations are scheduled to be carried out soon in the northern Caucasus.

In the northern part of the island of Sakhalin several fields are being developed, and the production here is expected to treble within the next few years. The field of Eastern Ekahadi will start production this year with ten wells already drilled. Oil is to be piped to the nearby town of Akha. Kamchatka also is being explored, and production is expected to be obtained within a year.

# 5-Year Purchase Clause in Contracts Governing New Cap Rock Field Outlet

Stanolind Oil Purchasing Company has included a 5-year purchase contract clause in the division orders prepared for operators in the Cap Rock field, New Mexico area, that is being given a direct pipe line outlet by Stanolind Pipe Line Company. A representative of the purchasing company has denied that similar contracts are to be submitted generally in the Permian Basin.

Stanolind recently built a line to an isolated field in the West Texas sector of the basin in anticipation of procuring the oil of its affiliated refineries but the bulk of the proved acreage in the field was acquired in the meantime by independents, using a cash loan advanced by a major company in return for the right to market the oil during the life of the properties.

The previously announced pipe line outlet for the Cap Rock field involves the laying of 73 miles of 8-inch second-hand pipe from the Slaughter field on Stanolind's West Texas-Oklahoma 16-inch carrier. Smith Contracting Company, Fort Worth, will start laying the line this week.

Stanolind has acquired Malco Refineries, Inc.'s, Cap Rock field gathering system.

Stanolind has boosted the capacity of its 16-inch trunk line from West Texas to Drumright, Okla., to 91,000 barrels daily through the recent completion of two intermediate stations and the addition of pumping units at Slaughter (Sundown), El Reno and Bretch stations. The carrier averaged 89,100 barrels daily the past week.

Mextex Pipe Line Company, a unit of Phillips Petroleum Company, has increased the capacity of its 8-inch combination products and crude carrier from West Texas to the parent company's Texas Panhandle refinery at Borger to 25,000 barrels daily through the completion of new main line stations near the Fullerton field and Olton, Lamb County. This line was placed in service October, 1942, as a natural gasoline carrier, and last February began including crude oil from West Texas fields.

Mextex gathering lines, a new unit of Phillips, made initial runs the past week through its Fullerton field gathering system and 5 miles of 6-inch discharge line to Andrews station on the products trunk line in handling 3500 barrels daily of Clear Fork and Devonian production controlled by Phillips. The gathering line operator is starting construction of an 8-mile 6-inch extension from Goldsmith field station on Mextex Pipe Line Company's trunk line to the TXL multi-pay field, where 7 miles of 4-inch gathering lines will be installed to connect with Phillips' 23 flowing wells in the Ellenburger, Devonian and Clear Fork zones. Surplus West Texas crude that reaches the Borger refinery of Phillips will be relayed in tank cars in meeting the deficit of its Kansas City, Kan., refinery, which normally operates on sweet crude.

## Work Started on Sinclair Corpus Christi-Austin Line

Sinclair Refining Company, natural gas-gasoline division, has started construction of 190 miles of products line from the company's Corpus Christi refinery to Austin, with extensions to San Antonio and Bryan.

This project is the first stage of an extensive system planned for the linking of its Houston and Fort Worth refineries for the delivery of finished products by pipe line to middle-western markets. The line from Corpus Christi to Austin will consist of 8-inch pipe, with a 6-inch lateral from a point near Luling to San Antonio, and a 6-inch extension from Austin to Bryan. O. C. Whitaker Company, Fort Worth, has contracted to lay the system, and moved in crews to work on opposite ends. W. W. Baker, with field headquarters at Bryan, is in charge of the project for Sinclair.

## Slaughter Gathering Lines Are Expanded by Magnolia

Magnolia Pipe Line Company is expanding its crude gathering system in the Slaughter field, West Texas, to serve the Northwest Slaughter, or White Face area, centering upon the Cochran-Hockley county line. The new facilities will consist of a 6-mile 4-inch discharge line and 21 miles of 2 to 6-inch gathering lines. R. H. Fulton & Company, Lubbock, Texas, was awarded contract, and began laying pipe late last week.

Magnolia is making pressure tests on the 17-mile 8-inch extension of its West Texas trunk line system from the Fullerton field to the Nelson 2-well field, near west edge of Andrews County, with a 6-mile 4-inch extension from the Nelson area to the Eunice, N. M., area. R. H. Fulton & Company began laying this line May 19. Magnolia has used common facilities of other companies in moving its sweet and semi-sweet crude gatherings in the Eunice area to Wink, Texas.

## Texas Company Lets Work For Hearne-Dallas Link

Contracts for Hearne pump station site preparation work and for construction of a 172-mile products pipe line linking Hearne, Dallas and Fort Worth, have been awarded by The Texas Pipe Line Company.

Associated Contractors and Engineers of Houston will build the line, a 10¾-inch from Hearne to West Dallas, a distance of 146 miles, and a 26-mile 8⅝-inch line from West Dallas to Fort Worth.

W. C. Wells, Jr., Beaumont contractor, has started clearing and construction of levees, tank grades, roads and preparing Hearne station site.

## Natural Gas Outlook for Next Winter Is Studied

Regulatory officials of 13 states met last week with the Federal Power Commission and its industry advisory committee to discuss means of coping with severe gas-supply shortages expected to occur next winter.

The discussion was concerned particularly with the situation foreseen in the Appalachian area and the territory served by Panhandle Eastern Pipe Line Company, and was one of a series of meetings arranged by the commission to prepare plans for equitable distribution of natural gas in various areas in which shortages may occur.

The group discussed proposals for allocation of gas moving through the big inch lines, and surveyed the effect of next winter's load and capacity situation on Panhandle's system.

## Ohio Streamlining Work To Continue During Year

The Ohio Oil Company will continue its program of modernizing and streamlining operations during 1947, O. F. Moore, vice president and manager of pipe lines, has announced. No major pipe line construction is planned.

During 1946 several electric, automatic gathering line pump stations were installed in the Illinois fields. These have resulted in a more efficient, flexible, and economic operation and several more are to be constructed as soon as equipment and materials can be obtained, Moore said.

A barge terminaling facility at Wood River, Ill., the west end of the company's trunk line system, will soon be completed.

## Shell Products Line

Shell Oil Company has authorized the construction of three 4-inch products lines to extend from its 30-million-foot daily capacity absorption natural gasoline plant in the TXL field, Ector County sector of West Texas, to a 20-car loading rack on the Texas & Pacific Railway near Judkins, Texas, involving 15 miles. The plant has been under construction since late February.

## Big Inch Connection

The Federal Power Commission has granted temporary authority to New York State Natural Gas Corporation to construct and operate a new 6000-hp compressor station and 1.1 miles of 20-inch connecting lines to the Big Inch facilities which will add up to 75,000 Mcf gas per day to the company's present capacity. The company plans to connect with the Big Inch line in Greene County, Pa.

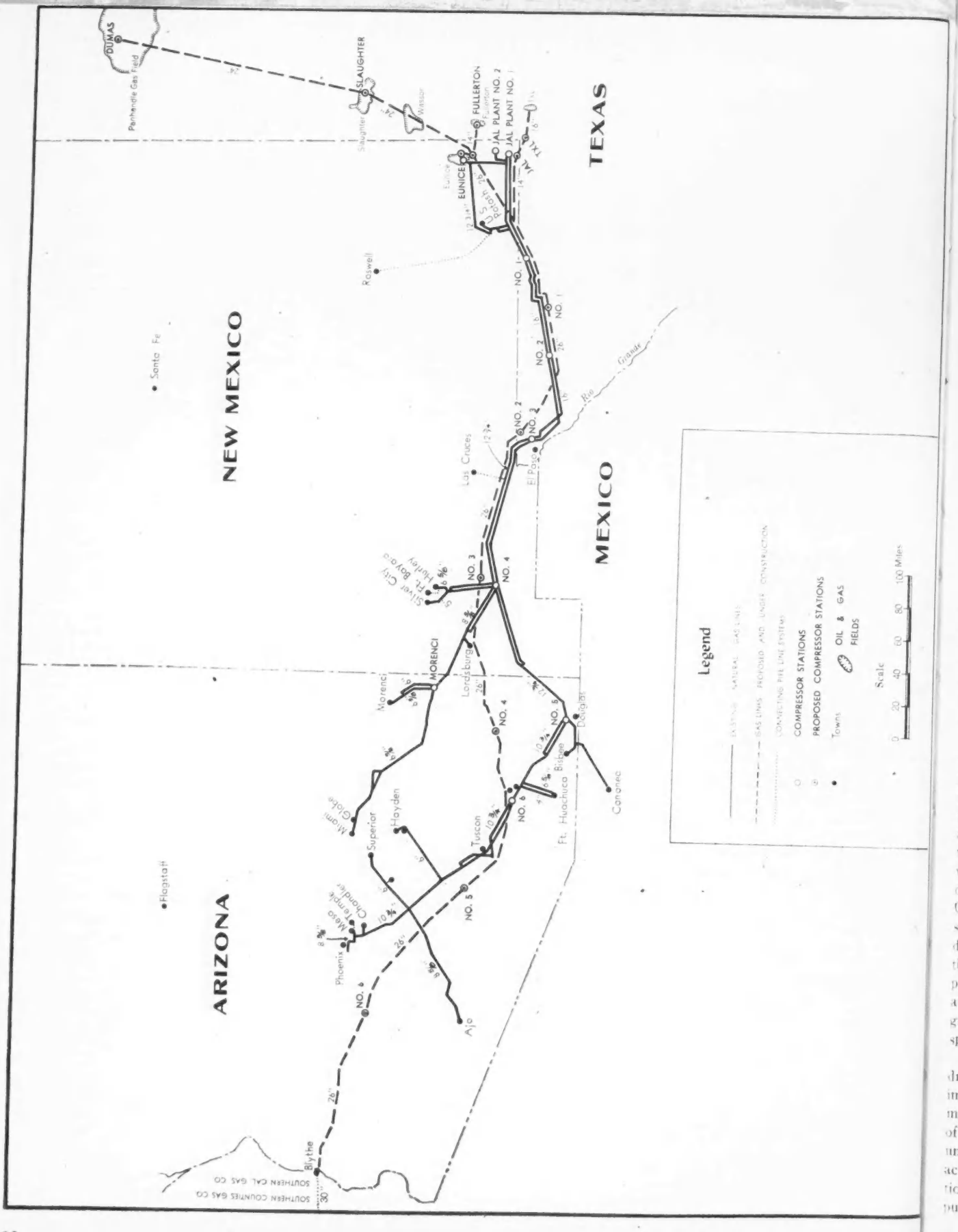
## Aramco Names Ray

Appointment of George W. Ray, Jr., for 25 years counsel for The Texas Company and since 1942 its general attorney, as general counsel for Arabian American Oil Company, has been announced.

Pipe Lines of the U. S.

# EL Paso Natural Gas Company And Subsidiaries

18th of a Series



By WILLIAM D. OWSLEY
Chief Engineer, Halliburton Oil Well Cementing Company

Figure 1. New deep-well cementing unit ready for the road. Immediately forward of the measuring tanks are the triplex pumps, one of which is shown here. The box-like structure completely encloses the two diesel engines and the power transfer mechanism. Either of these engines may be used to drive the unit over the road.

# New Deep Well Cementing Unit

CONSTANTLY changing practices in drilling wells for oil and gas directly affect the methods and equipment used in cementing these wells. As well depths become greater, pressure requirements for cementing increase, and speedy mixing of slurry and handling of displacing fluid bcome highly necessary.

Until about the middle of 1932, average cementing pressures for all types of jobs were less than 1000 pounds per square inch, while available maximum pressure from equipment then generally available was less than 3500 psi. Late in that year it was seen that, if the desired volumes of cement were to be placed in deeper wells, especially in the Gulf Coast, greater speed and higher pressures had to be obtained. To meet this demand, a cementing truck carrying three steam pumps arranged for compounding, was produced. This unit raised available pressures to about 4500 psi and greatly increased mixing and pumping speeds.

During the next few years, power-driven cementing pumps were gradually improved until 1936, when plans were made to produce a vastly improved type of power-driven cementing pump. This unit, a vertical type duplex double-acting pump, was placed in field operation during 1937. The vertical cementing pump was first designed to operate at a maximum of 6000 psi, and in improved versions, is in general use today, attaining pressures up to 8000 psi.

In 1938-39, an improved three-pump steam unit was produced, using 12 x 4½ x 12 pumps which also could use four-inch liners. This steam unit with some refinements is the present standard steam powered cementing equipment. Where adequate steam is available, it can handle pressures to about 9000 psi, and has mixed cement under ideal conditions at rates up to 45 sacks per minute.

Steam-powered pumps would seem to offer in most cases the best answer to the demand for a compact, flexible and powerful cementing unit, but since such pumps depend on boilers at the rig for steam, their usefulness is limited to steam drilling rigs. Steam-powered drilling equipment began to decline in general use before the beginning of World War II, but was revived in popularity during the war years because of emergency conditions which had to be met with any equipment available.

Long-range planning begun in 1943 recognized the need both for immediate provision of higher pressure equipment, and for ultimate production of really flexible, safe and powerful motor-driven cementing units. Immediate needs were met by providing steam units of five pumps instead of three, and by a portable flash boiler unit, these for the very critical pressure conditions of the Gulf Coast. At the same time, a survey was commenced to lay the ground work for the future motorized equipment.

Comprehensive inquiry among oil well cementing company employes, oil company engineers and management, contractors, and the "man on the rig floor" was made. This revealed many interesting and valuable ideas, the high spots of which were as follows:

Use of steam equipment would decline rapidly after the war.

High-powered motorized cementing equipment would be essential.

For this future motor-driven unit, the survey further indicated:

Maximum operating pressure 10,000 psi.

A mixing rate for cement of at least 25 sacks per minute, preferably higher.

A fluid-handling rate for measuring displacing fluid of up to 10 barrels per minute under lowest pressures.

Fluid rate of maximum discharge pressure was not considered too important. Estimates ranged as low as ten gallons per minute. However, averages agreed that approximately 20 gpm at 10,000 psi would be ample for that pressure; and that it probably would never be necessary to operate for more than

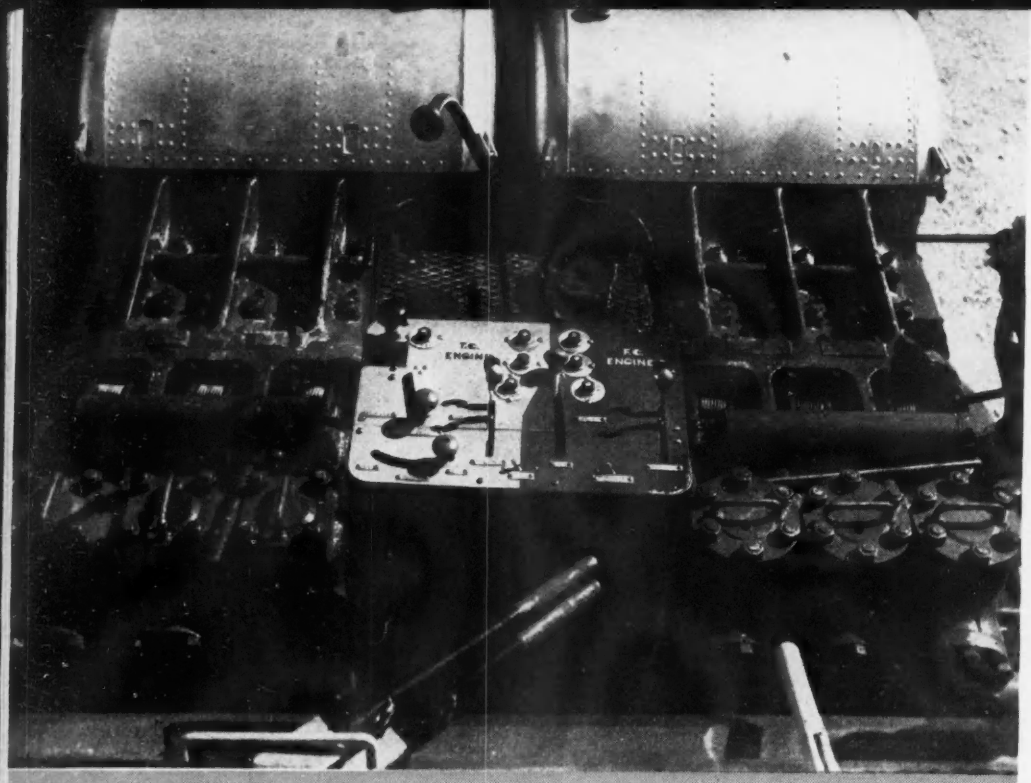



**Figure 2. Looking forward over the measuring tanks to show the operator's control panel and the two triplex pumps. Controls on the left are mounted on a yellow panel and control the torque converter section, while those on the right are mounted on a red panel and control the fluid coupled engine.**

one hour continuously under the 10,000 psi maximum pressure desired, but that ample safety factors on time should be provided and that in the range of middle pressure 24-hour duty would be expected.

A heavy emphasis on overall dependability under any circumstances with provision for getting out of trouble in event of either engine or pump failure.

The service company personnel added many other items, some of which were as follows:

Driver comfort, best possible vision, cab roominess, ease of steering, and powerful brakes.

Truck to have a reasonably high road speed, yet be able to properly negotiate unimproved roads.

Unanimous desire for diesel engines.

Unitized controls and a full complement of instruments conveniently located to the operator's vision.

Simple, safe and convenient manifolding for best possible hookup to the well.

Ease of maintenance and rapidity of repair by reason of accessibility.

After study of the survey, a description was written of a cementing unit which would fulfill all of the needs shown and as many of the desired items as was considered practical. This description has been followed in all the later steps of design on the pumps, the truck and the auxiliary equipment required. Briefly stated, it described a vehicle carrying two diesel engines so coupled into a power transmission system that either engine could drive either the truck itself or either or both of two pumps mounted on the truck. That the two pumps to be carried should be arranged so that one of them would handle high pressure at medium to low fluid volumes while the other would carry high to medium volume at low to medium pressure; that either one could be used either as slurry pickup or mixing water pump and that both could handle displacing fluids separately or simultaneously.

### Building a "Super-Cementer"

It at once became apparent that no truck or pump then in existence would meet the requirements of the unit desired and that to design and build this equipment would be extremely expensive. In view of greatly increasing well depths, abnormal well pressures and consideration of future possibilities in the drilling of wells, it was decided to proceed with the project and build a "super-cementer." The result of this work is the unit shown in Figure 1.

A four-wheel drive truck company was engaged to design and build the special vehicle in cooperation with the company's mechanical research and development section of the engineering department while at the same time, company engineers designed the special pumps and lined up the other required equipment. Throughout the design and development stages, these two companies enlisted the special assistance of more than 20 other firms and many others supplied various items used in the final unit.

In the entire job, special consideration was given both to weight distribution and overall weight in the unit. Free use was made wherever possible of aluminum and magnesium alloys. Parts which necessitated the use of steel were designed in heat-treated alloys for greatest serviceability and safety with the least possible metal.

The two pumps carried on the truck are triplex, outside packed, plunger, single acting type. Both are of ten-inch stroke and by use of two different fluid ends can carry plungers from four-inch to six-inch diameters. In the four-inch size, they are capable of operation considerably in excess of 10,000 psi, while the six-inch size is capable of handling fluid at slightly more than 460 barrels per hour or about 43 sacks of cement per minute.

The power end frame is a casting of heat-treated aluminum alloy, as also are the connecting rods. The fluid end is of cast alloy steel, heat treated to 110,000 psi tensile strength. The crankshaft is cone worm gear driven and is carried on five large roller bearings. Split shell, precision fitted, aluminum alloy bearings are used in the crank end of the connecting rods. The crossheads run on aluminum shoes in steel, chromium-plated guides. The entire power end is force-feed lubricated by two pumps operating from the worm shaft with the oil being passed through a heat exchanger and filter to provide long periods of trouble-free operation.

In the fluid end, the plungers pass completely across the valves and nearly up to the cylinder heads in a close clearance cylinder to provide the lowest practical unswept volume and produce high fluid efficiency with excellent suction chararacteristics for the handling of heavy and viscous fluids. Valve seats are cylindrical rather than tapered and are sealed with "O" rings in close bores to allow for easy removal after being used under high pressure. The plungers are packed in glands using "V" packings and a labyrinth into which is fed oil under pressure on each suction stroke. The glands are adjusted by a follower actuated by a modified worm and gear to rotate and advance the entire follower, thus providing even gland pressure on the packing. This gland assembly includes closely fit bearings for plunger alignment. The plungers are tubes of heat-treated alloy steel which are ground, chrome plated, and super finished to —4 microinch surface quality. Each plunger is attached to its crosshead by means of a central rod and a single nut in the plunger nose. This connection is covered by a threaded plug and "O" ring to seal against fluid pressure.

Access to the discharge valves is through individual valve pots and bolted-on covers with self-sealing gaskets. Suction valves of the same size as the discharge valves are reached through the

cylinder head openings. In the smaller higher pressure fluid end, the suction and discharge valves are of equal size, but in the lower pressure, high volume fluid end, the suction valves have a flow area of about 150 percent of the discharge valves. This feature assists in handling viscous fluids at high pumping speeds.

In the power transmission system of the unit, there are many unique features. The two diesel engines are equipped with large ported liners and 70 mm injectors to deliver 123 horsepower each at 1800 revolutions per minute. Both engines and all power transmission equipment are located in an engine house rearward of the truck cab; there is no engine either ahead of or under the cab as in conventional truck design.

While it is possible to apply either engine to drive the truck, the right-hand one is ordinarily used for this purpose. This engine is engaged by means of an automotive type clutch and a fluid coupling into a reversing gear and three-corner chain drive, thence into a five-speed transmission and built-in power takeoff.

The high pressure pump connects to the transmission power takeoff shaft by a torque tube drive while the truck axles are driven from the transmission transfer case. From the remaining corner of this chain drive, a diagonal shaft connects to a similar chain drive on the opposite or left-hand engine. This shaft is used to transfer power from either engine to either the truck or the pumps in emergency or for any desired cross-over operation.

The left-hand engine connects into the power assembly through a torque converter to a three-corner chain drive, thence by a torque tube drive to the high-volume pump. The diagonal power transfer shaft connects to the remaining corner of this chain drive.

The torque converter is so arranged that power can be transmitted either by hydraulic torque conversion drive or by direct engine drive into the chain case and thence to either of the two pumps or to the truck as desired.

By means of the diagonal power transfer shaft and the other arrangements as described, it is possible to apply either of the engines to the truck drive, the high-pressure pump, the high-volume pump, or to operate both pumps at the same time with only one of the two engines. The engines are not arranged for compounding the power of both into any one of the components to be driven; however, power may be delivered through the torque converter through any of the five speeds of the transmission to the high-pressure pump for attaining the highest possible pressures, or to the truck drive for unusual pulling conditions. The first is particularly advantageous in applying extreme test pressures to closed-in well systems and for certain severe squeeze cementing jobs.

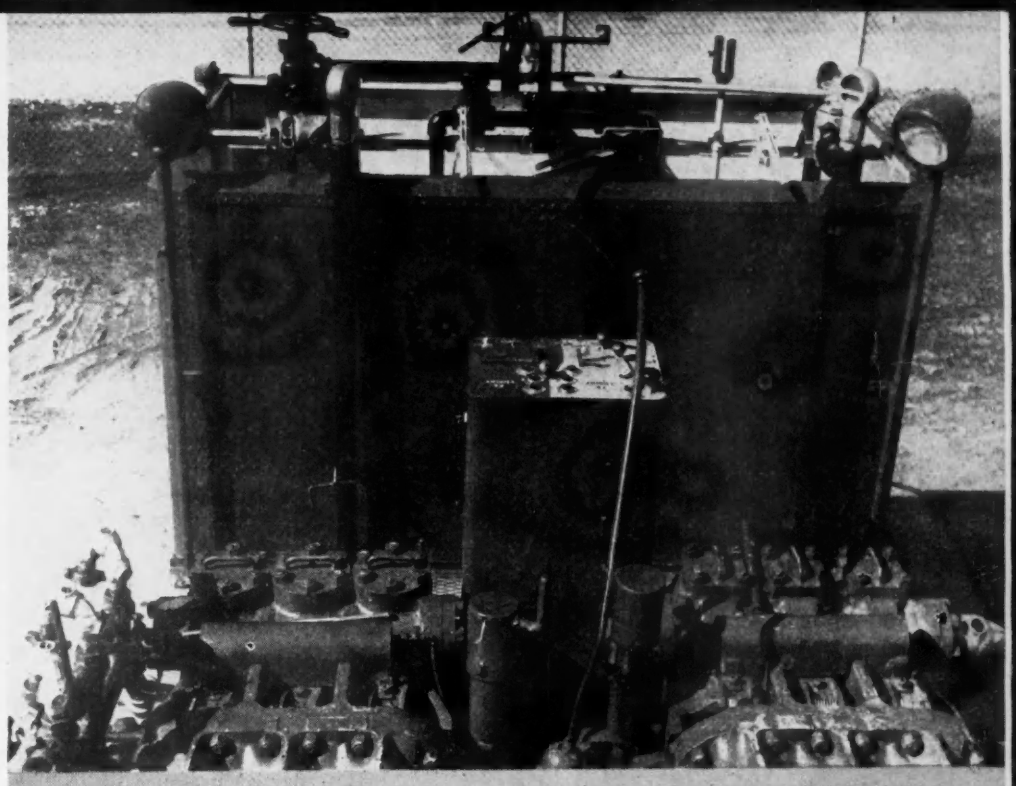


**Figure 3. Rear view of the operator's control position during cementing operations. All transfer valves, engine controls, measuring tanks and instruments are within easy reach of the operator.**

At the operator's position in the cab are located all the conventional controls necessary to road operation of the truck. In addition, on the dash are located pneumatic controls for disengaging truck road gear and engaging the power take-off gear to pump while at the same time changing over from cab position gear shift to rear or pump station gear shift. Here also is located the control for engaging the power transfer shaft cross-over application of the engines and controls for the extra engine.

At the rear station control panel, shown in Figures 2 and 3, are the start, stop, emergency stop, and throttle controls to both engines. Here also are the clutch controls to both engines and the selector control for either torque converter or direct drive from the left-hand engine. In the lower section of the control station is housed the 10,000-pound recording pressure gauge connected to the discharge manifold of the pumps. On the rear wall of the engine house, as shown in Figure 1, is an instrument panel with tachometer, ammeters, oil pressure, and water temperature for both engines, and oil temperature and pressure for the torque converter. Two warning signal lights indicate low oil flow in the three-corner chain-drive cases. Directly in front of the control panel is the gear shift lever for the transmission.

Several types of remote controls were necessary in both the cab and rear station positions. All clutches to the engine, chain cases and transmission power take-off gear are air controlled, as is also the gear shift switch-over from front to rear stations. All throttles are hydraulically controlled. Engine governor start and stop, and emergency stop devices are electrically actuated by solenoids. The only mechanically direct connected controls are the front and rear station transmission gear shifts.

All of the components of the entire power assembly are mounted to the truck chassis on rubber shock blocks of several types. The radiators are supported on rubber trunnions so fixed that they move with the engines, and are not affected by distortion of the truck chassis. Likewise, the pumps and all manifolding are rubber cushion-mounted. This results in a very quiet running unit with minimum vibration under all conditions of load.

The pilot model of the super-cementer was placed in field operation at Houston in February, 1947. Up to the present it has completely met all demands and so satisfactorily lived up to the expectations of its builders that a large group of similar units is now under construction. The ability of such a cementing unit to handle high pressures and volume while at the same time providing safety features such that the failure of a pump or engine will not mean failure of the cementing job being handled, is a gratifying answer to the present day demands of deep well drilling

# Geophysical Principles

## For Determining Subsurface Conditions

By R. MAURICE TRIPP
Consulting Engineer

PROSPECTORS seeking ore bodies long ago recognized that the presence of a metalliferous ore deposit tended to upset the equilibrium of the chemical, physical and/or biological environment. Certain features of these anomalous conditions were observed and interpreted as signs of ore almost subconsciously, but few if any prospectors could have explained the reasons. But despite their inability to define what they observed, let alone explain it, they found ore bodies.

It still is not essential to be able to explain the mechanism of a set of reactions to observe them; however, if we can understand what we observe, we begin to appreciate the limitations and applications to the point of dispensing with purely intuitive decisions. This philosophy applies equally well to prospecting for oil reserves and already permeates the thinking of many geologists.

The following ideas are not proposed as the solution to the problem of oil finding, but rather as a working hypothesis to account for certain geochemical anomalies encountered in the Rocky Mountain province.

It can be shown thermodynamically that if one mole of methane in the reservoir diffuses through the low-permeability overlying sediments slowly enough to maintain thermal equilibrium such that the process may be considered reversible, one is led to some interesting ideas. Let it further be assumed that the methane is saturated with water vapor at all times, that the migration path lies along the maximum geothermal gradient and the minimum pressure gradient (hydrostatic), that the mixture obeys the gas law PV=nZRT, and Dalton's Law does not require a significant correction.

There is experimental evidence to indicate that the movement of the water-vapor saturated methane through the sediments is not simple permeation or diffusion, but a modified D'Arcy's equation probably describes the action approximately as follows:

$$Q = \frac{KA}{\mu(1+m)\,Ln}\left[P_1^{1+m} - P_a^{1+m}\right]$$

Where Q = flow of gas in cc/second
K = permeability in darcys
A = cross sectional area of flow in $cm^2$
$\mu$ = viscosity of gas in poises
m = thermodynamic character of expansion of gas; for isothermal m = 1 for adiabatic

$$m = \frac{cv}{cp}$$

$L_n$ = distance from reservoir to surface in cm
$P_1$ = reservoir pressure in atmospheres
$P_a$ = partial pressure of gas at surface in atmospheres.

If this equation is solved for the volume of methane reaching the surface from a reservoir at a depth of 4500 feet under hydrostatic pressure and with an effective permeability of the overlying sediments of 10-7 darcys and a value of 0.86 for m, the result is approximately 4000 moles per acre per year. (It should be noted that reservoir pressure would always be in excess of the hydrostatic pressure; therefore the above figure represents a minimum value.)

R. MAURICE TRIPP received his degree of Geological Engineer from the Colorado School of Mines. He spent nearly four years in seismic exploration, part of which took place before graduation. This was followed by a period of intermittent graduate research at Colorado Mines and MIT, eventually leading to a doctor's degree, interspersed with teaching and consulting work. During the early period of his graduate work he became interested in the possibilities of the direct location of minerals and petroleum. Most of the subsequent research was directed toward this objective. In 1944 he returned to the Geotechnical Corporation as assistant to the president and director of the research laboratory. During the summer of 1946 he was senior scientist for the Bureau of Ships in charge of seismic observations in connection with Operation Crossroads.

It is possible to go a step further and trace the history of the gas as it migrates to the surface under a mean geothermal gradient of 0.0187° C/foot and a pressure gradient of 0.0306 atmospheres/foot. For convenience it may be assumed that we have a volume unit of one cubic foot or 0.3045 moles of methane at reservoir conditions. A solution of the equation,

$$PV = nZRT$$

Where P = pressure
V = volume
n = mol fraction
Z = compressibility factor
R = universal gas constant
T = absolute temperature

describes the state of the gas under the influence of the changing environment. Results are tabulated in Table 1.

Throughout the course of upward migration, the variation in volume and temperature determines the amount of water vapor carried by the constant mass of methane. Any change in the ability of the gas to carry water vapor must be accompanied by evaporation from or condensation to the formational fluids. The water content of the methane can be determined from data published by Olds, Sage, and Lacey.[1] However, their experimental data do not extend over the entire range needed for this problem. The method by which the desired data was obtained from the reported experiments is contained in a paper by Tripp.[2] Figure 1 indicates the equilibrium water content over the section described.

With information on the minimum rate of flow of the gas toward the surface and its water vapor content along the path of migration, it can be calculated that a minimum of 25,000 cubic feet of water vapor is being evaporated from the upper 25 feet over an acre area in a year's time. A condition of this sort might well be suspected of producing an anomalous equilibrium condition in the near surface zone. To appreciate the consequences involved it is necessary briefly to consider the energy transfer when a gas expands through a permeable medium to a new environment of temperature and pressure; also the influence of evaporation phenomena on the soil solution.

The enthalpy of methane, $H_1$, at 205° F

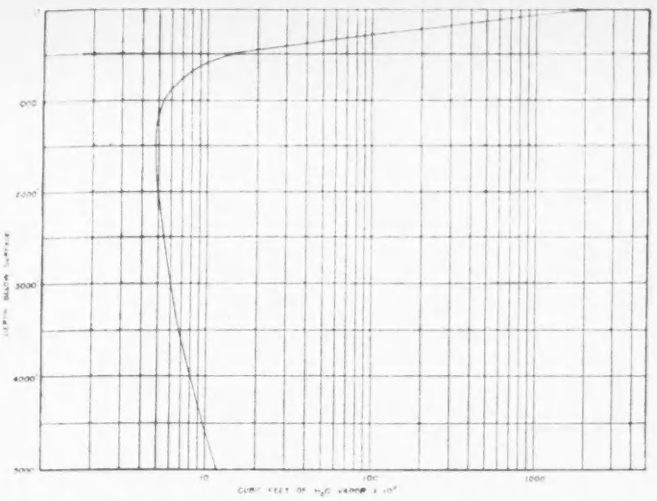


Figure 1. Water content of 0.3045 moles of saturated methane as a function of the depth below surface.

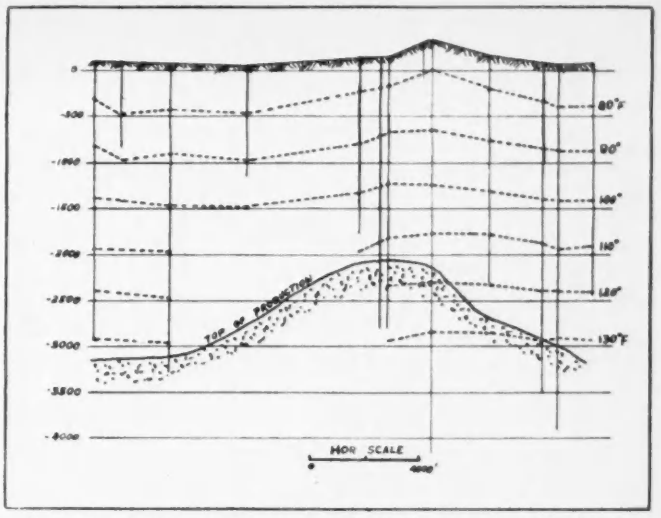



Figure 2. Profile across Long Beach California, oil field showing iso-geothermal surfaces.

and one atmosphere is the product of the mean heat capacity, $C_p$, between 0° and 665°R and the temperature 665°R.

$$H_1 = C_p \times T = 8.33—(.0053/2) \times 205 \times 665 = 5900 \text{ BTU's/lb mol.}$$

However, the gas pressure is 138.5 atmospheres instead of one atmosphere. The pressure correction, $\Delta H^*$ may be determined from the following relation:

$$R(\delta \ln \partial / \delta \ln T_r)\ \Delta H^*/T^2$$

Where $\partial$ = activity coefficient
$T_r$ = reduced temperature
$T$ = absolute temperature
$R$ = universal gas constant

The correction $\Delta H^*$ must be substracted from the enthalpy at 205°F and one atmosphere to obtain the value for 205°F. and 138.5 atmospheres.

$$H^1 = H_1 — \Delta H^* = 5900—658 = 5242 \text{ BTU's/lb. mol}$$

The enthalpy at 52.6° F. and one atmosphere is similarly determined to be:

$$H_2 = 4350 \text{ BTU's/lb mol}$$

The pressure correction in this case not being significant.

The total change in enthalpy going from the reservoir to the surface becomes,

$$H = H^1—H_2 = 5242 — 4350 = 892 \text{ BTU's/lb mol.}$$

A loss of this amount of energy by the methane would produce a temperature drop,

$$\Delta T = 892/8.33 — 0.0053/2 (205 — 52.6) = 101.8° \text{ F.}$$

However, the actual temperature drop amounts to 152.4° F.

The excess of the actual drop over that resulting from the expansion process could be caused by evaporation of water from the connate fluids or by heating the surrounding rocks. Table 1 shows that $4.97 \times 10^{-3}$ pounds of water are evaporated per mole of methane and that $0.982 \times 10^{-3}$ pounds of water are condensed per mole of methane along the path of migration. The net vaporization amounts to $3.982 \times 10^{-3}$ pounds of water per mole of methane.

By assuming all of the vaporization to take place in the upper 25-foot zone and all condensation to take place at —3750 feet, a reasonably accurate solution of the heat balance equation indicates a net loss of 4.29 BTU's/mole which would lower the temperature of the methane by 0.506° F.

The cooling produced by expanding through the sediments plus the cooling resulting from the evaporation of water vapor does not account for the total cooling known to take place; therefore the difference must be dissipated to the rocks through which the gas passes. Figure 2 is a profile through the Long Beach, Calif., field taken from Van Orstrand which shows a thermal anomaly of this type. This is a commonly observed anomaly, but there is no direct proof that this hypothesis is any better than the current ones.

### Secondary Mineralization

The loss of more than 25,000 cubic feet of water vapor/year/acre is not an impressive figure when considered with respect to other variations in the near surface zone, but the fact that there is always a relative loss over an accumulation as compared to the surrounding region renders it more significant. The consequence of this local phenomenon might be the precipitation of ions having a very small solubility product or the flocculation of hydrophyllic colloids having a small zeta potential. Fluctuations in the volume of the soil solution due to climatic variation and lateral circulation need not invalidate the hypothesis since the evaporation is a continuous process and the section through which the gas passes will always be slightly more concentrated than adjacent areas.

With the above considerations in mind, the soil solution was examined for compounds of extremely low solubility which might have a good chance of occurring over a wide area and also be amenable to accurate analysis at very low concentrations. Several compounds were found which met these requirements in varying degrees. Certain compounds with the radioactive elements appeared to be superior to all others from a practical standpoint. This preference was based upon the fact that nearly all sedimentary rocks contain measurable quantities of the radioelements. During the development of the soil profile and the leaching away of the more soluble constituents, the less soluble radioactive minerals are surfi-

**TABLE 1**

**Pressure, volume, temperature, and water-vapor content of 0.3045 moles of methane migrating upward from the reservoir under a pressure gradient of 0.0306 atmos/foot and a thermal gradient of 0.0187° C/foot.**

| Depth in Feet | Temp. °C. | Absolute Pressure Atmos. | Comp. Factor | Relative Vol. of $C_3H_4$ Feet | Vol. $H_2O$ Vapor $Ft^3 \times 10^2$ | Interval Evap. $Ft^3 \times 10^2$ |
|---|---|---|---|---|---|---|
| 0 | 11.45 | .816 | .999 | 139.3 | 237.0 | 115.8 |
| 10 | 11.64 | 1.122 | .997 | 101.1 | 121.2 | 76.1 |
| 25 | 11.94 | 1.578 | .996 | 71.5 | 45.1 | 17.9 |
| 50 | 12.43 | 2.343 | .995 | 48.5 | 27.2 | 17.0 |
| 100 | 13.32 | 3.88 | .991 | 29.2 | 10.2 | 7.6 |
| 250 | 16.37 | 8.46 | .983 | 13.4 | 2.6 | 1.56 |
| 500 | 21.30 | 16.10 | .971 | 7.11 | 1.55 | 0.52 |
| 1000 | 30.15 | 31.40 | .948 | 3.66 | .53 | .05 |
| 1500 | 40.00 | 46.75 | .934 | 2.50 | .48 | .03 |
| 2000 | 48.85 | 62.0 | .926 | 1.92 | .51 | .04 |
| 2500 | 58.70 | 77.4 | .922 | 1.58 | .55 | .05 |
| 3000 | 67.55 | 92.6 | .924 | 1.36 | .60 | .07 |
| 3500 | 77.40 | 107.9 | .929 | 1.20 | .67 | .09 |
| 4000 | 86.25 | 134.2 | .933 | 1.09 | .76 | .19 |
| 4500 | 96.10 | 138.5 | .938 | 1.00 | .95 | ... |

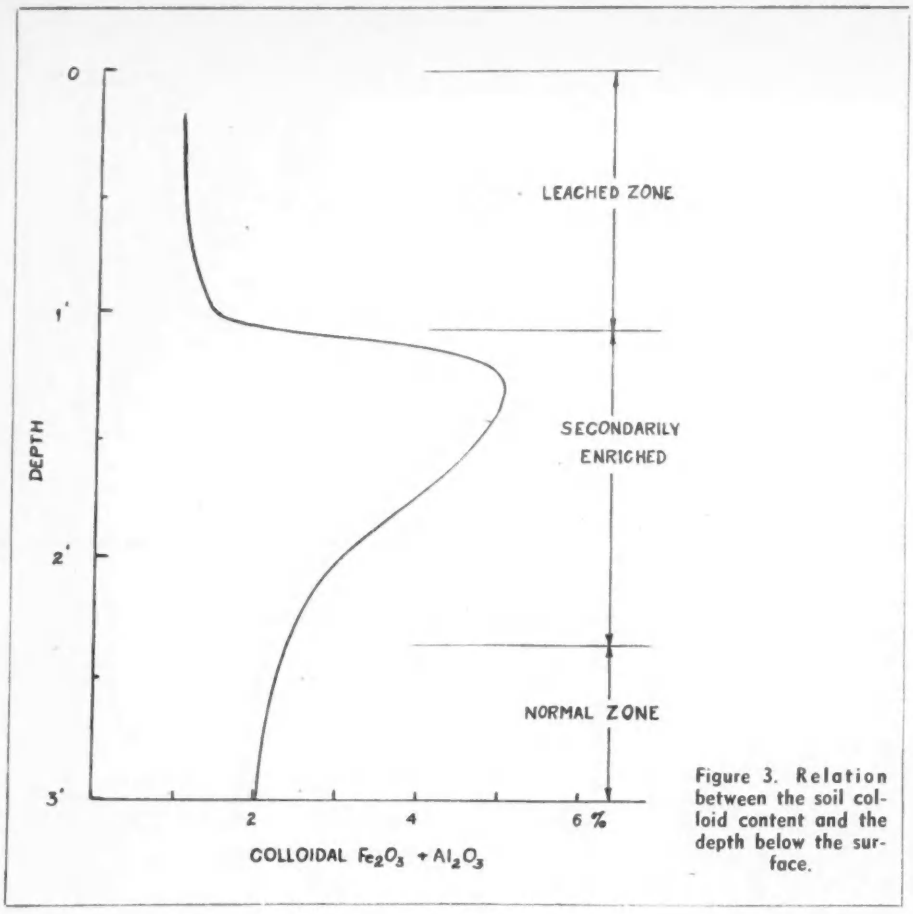



**Figure 3. Relation between the soil colloid content and the depth below the surface.**

cially concentrated. An abundance of source material is therefore assured; consequently a saturated condition of the soil solution. In addition, certain compounds of the radioactive elements have a tendency to form meta-stable colloidal dispersions in neutral or slightly acid solution producing a sol of low zeta potential. Equally important is the fact that simple and rapid analytical techniques are available for quantitatively analyzing for minute concentrations of radioactive material.

An additional phenomenon, which might be called tertiary mineralization, may take place in the soil between the escaping hydrocarbon gas and the radioactive minerals which have been deposited as a result of the escaping gas.

Soil is a complex and dynamic system in which colloidal phenomena play a large role. Many of the minerals have been reduced to the submicro range by weathering and decomposition until the colloidal fraction which may constitute only a small percent of the total composition contributes to 80 or 90 percent of the exposed surface. Under average Mid-Continent climatic conditions, the colloids are concentrated in a zone occurring roughly between one and two feet beneath the surface. In this zone is found the highest content of absorbed gases and flocculated colloidal minerals. The amount of absorbed gas is a function of the partial pressure of the gas, the available surface area, the temperature, the structure of the solid surface, the presence of other adsorbable constituents or impurities, and the free surface energy of the mineral grains composing the soil. This last factor is extremely important and varies widely with the mineralogic nature of the particles and the relation of the exposed faces to the crystal axis.

In spite of this variability of properties from one soil to another, within an area dominated by a single soil unit it usually is possible to obtain correlative data.

Under the conditions already described where the upward escaping hydrocarbon gases have caused the flocculation of certain mineral colloids, including some containing radioactive elements, the gases are in turn absorbed by finely divided mineral particles in the soil zone and come into intimate association with some of the secondarily concentrated radioactive minerals.

The disintegration of the radioelements and their related products supplies high energy alpha particles which bombard some of the adsorbed hydrocarbon gases and initiate a condensation reaction which results in the formation of liquid and solid hydrocarbons. A theory for the mechanism of this reaction has been proposed by Lind and Glockler[4] and Shepard and Honig.

Waxy material formed in the soil zone by this process differs from vegetable waxes which are common and widely distributed in that the former are paraffinic as distinguished from the latter which are largely higher alcohols, fatty acids, aldehydes, ketones, or a mixture thereof. The dominant paraffin formed as an end product in this reaction appears to vary from one locality to another but is quite consistent locally.

In spite of the wonders of modern science, most geologists are finding that they cannot see any farther into the ground than did their grandfathers. Since most of the information they seek is concealed beneath the surface they are obliged to dig a hole or devise means of obtaining data from which the desired information can be more or less reliably inferred. The most productive means of searching for petroleum at present consists of looking for structures favorable for its accumulation. An obvious improvement would be to look for the oil itself, but so far no one has been able to demonstrate to the industry's satisfaction that this can be accomplished. The relationships pointed out above offer a means under certain conditions whereby a semi-direct approach is possible. The technique consists of determining the concentration of radioactive minerals in the zone of maximum colloidicity and simultaneously determining the mineral wax content.

The concurrence of anomalies in both properties has been experimentally demonstrated to be related to the occurrence of petroleum at depth. However, the experience background has been obtained in areas thought to be ideal with respect to soil and climatic conditions. The method is not necessarily universally applicable. There are many reasons why either the radioactive mineral content or the solid hydrocarbon content should reach an anomalous state which has no relation to subsurface petroleum. However, the chance of these two properties becoming similarily and simultaneously anomalous in a non-petroliferous area is very unlikely even though statistically possible.

Areas for experimental investigations have therefore been carefully selected to avoid these random anomalies if they do occur. For that reason it is not known how generally applicable the method may be. Further research and additional field experience will determine the proper scope of the method.

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# RECENT DEVELOPMENTS IN

# Casing Standards and Design

By JOHN WAIS, JR.
Pittsburgh Steel Company, Los Angeles, California

**Increasing numbers of washouts and thread leaks in casing under higher pressures encountered in deep drilling have led to the proposal that three turns of makeup be specified and that tools and procedure be changed to permit this increase without damage to pipe. This article discusses development of new standards and the possible effect on casing and coupling threads.**

DURING the period from 1941 to the present, almost all proposals for revision of API pipe specifications have been held in abeyance due to the war emergency, while demands for changes resulting from new field requirements have accumulated. As a result, proposed changes that are now in the experimental stage or on the agenda of the pipe committee undoubtedly will aid in the solution of some of our more serious casing problems.

Intensive work on thread specifications during the past ten years has resulted in basic standards which are sufficient for normal requirements. However, in order to resist loads and pressures incidental to the drilling of wells to increasing depths, it has become evident that the necessary improvements cannot be accomplished by further changes in thread form or related specifications alone.

The primary objectives of the changes under consideration:

1. More effective resistance to joint leakage at high pressures.
2. Higher joint strength.

Considerable progress toward accomplishing these objectives has already been made by laboratory developments and field tests on factors such as lubricants, makeup, and joint design.

These developments involve design, manufacturing, and field application, and some of them require additional information from users to permit final decisions. Accordingly, it is the purpose of this paper to review these proposals and developments and to discuss the field requirements that prompted them as well as field problems relating to their full utilization.

### Thread Makeup

Thread makeup has long been recognized as one of the obvious factors affecting leakage. However, its importance became more evident when hydrostatic testing of threaded joints at internal pressures above 5000 pounds per square inch was undertaken.

The former practice of using a nominal 2 or 2½-turn makeup from hand-tight, depending on the size, has resulted in satisfactory resistance to leakage at routine internal hydrostatic test pressures of 3000 psi maximum. However, supplementary testing to pressures of 5000 to 7000 psi showed leakers on the order of 25 percent, as reported by Kettenburg and Schmieder.[1]

It was found repeatedly by various experimenters that greater makeup almost invariably reduced this leakage or stopped it entirely. Also, it has been noted repeatedly that joint efficiency reaches an optimum value at slightly more than three turns makeup, and rarely shows any decrease due to excessive makeup until considerably past three turns. Thomas and Bartok[2] showed detailed results of numerous tests of the effect of makeup on both leak resistance and joint efficiency and their results have been checked very closely by several observers.

In recognition of these results the API pipe committee increased the hand-tight standoff by one turn, subject to letter ballot. The effect of this action is to allow for one more turn of makeup and it is up to the manufacturer when assembling couplings, and the casing crew when running pipe, to make up the joint the additional turn. To accomplish this will require considerably higher torque and much greater precaution to avoid damage to the pipe or coupling.

The problems incidental to greater makeup relate primarily to prevention of damage to threads and crushing of pipe. Greater care must be exercised in cleaning threads in order to eliminate all dirt and foreign material that might increase friction and the consequent tendency to gall.

Thread dope must have adequate lubricating properties to eliminate excessive friction under the high surface pressures incidental to the added makeup. The desirable properties of thread lubricants have been discussed at length in other papers but it will bear repeating that such lubricants must contain a sealing agent capable of closing the root and crest clearances as well as the permissible imperfections of the threads. Also, it must offer protection for the threads against corrosion before and after being run into the well.

Tongs must have gripping surfaces of proper size and shape to prevent flattening or notching the pipe. It has been recognized generally that any damage to the surface of pipe is detrimental, but its real significance became evident in laboratory tests prompted by field service burst failures located about one to two feet above collars, where tonging normally takes place.

### Effect of Notching and Flattening

Internal hydrostatic pressure tests were made on N-80 casing with various combinations of flattening and longitudinal notching. The theoretical effect of internal pressure on a flattened tube is to tend to round it out, causing an exaggerated tensile stress at the outside surface of the flattened area due to bending. This effect is further magnified by concentration at the root of any notch in the flattened area.

Test specimens were prepared in a compression testing machine to permit accurate dimensional control. Notching was performed with a single die six inches in length and ground to a sharp 60-degree edge. The fully flattened area was approximately six inches long in all cases.

It was found that the critical combination is that of a longitudinal notch located at or near the center of the flattened area. Notches alone up to

From a preprint of paper scheduled for presentation at the Spring Meeting, Pacific Coast District, Division of Production, American Petroleum Institute, Los Angeles, California

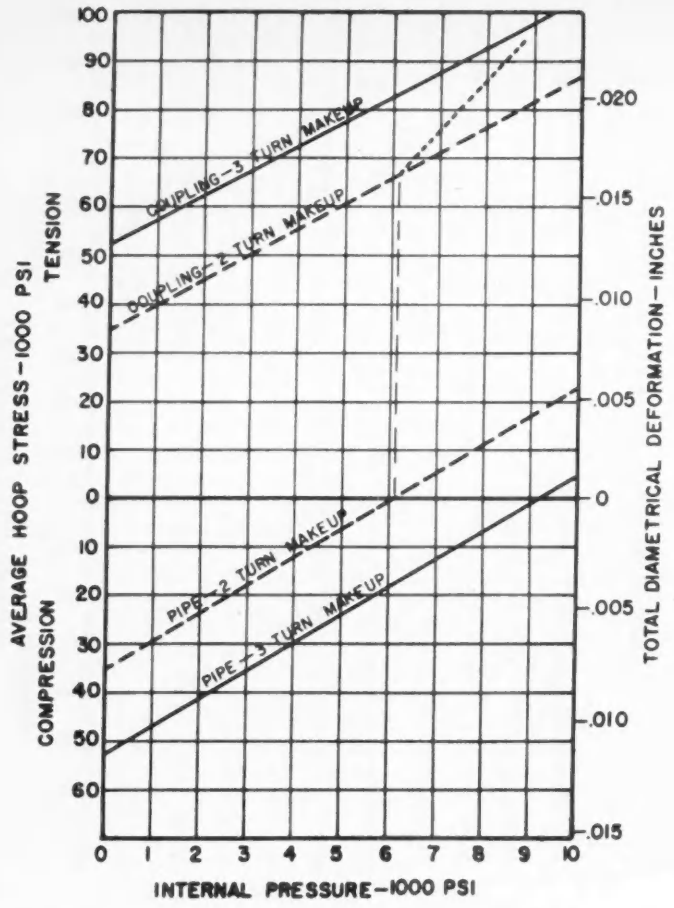


**Figure 1. Average hoop stress at hand tight plane 7-inch by 29-pound casing with 7.656-inch outside diameter coupling.**

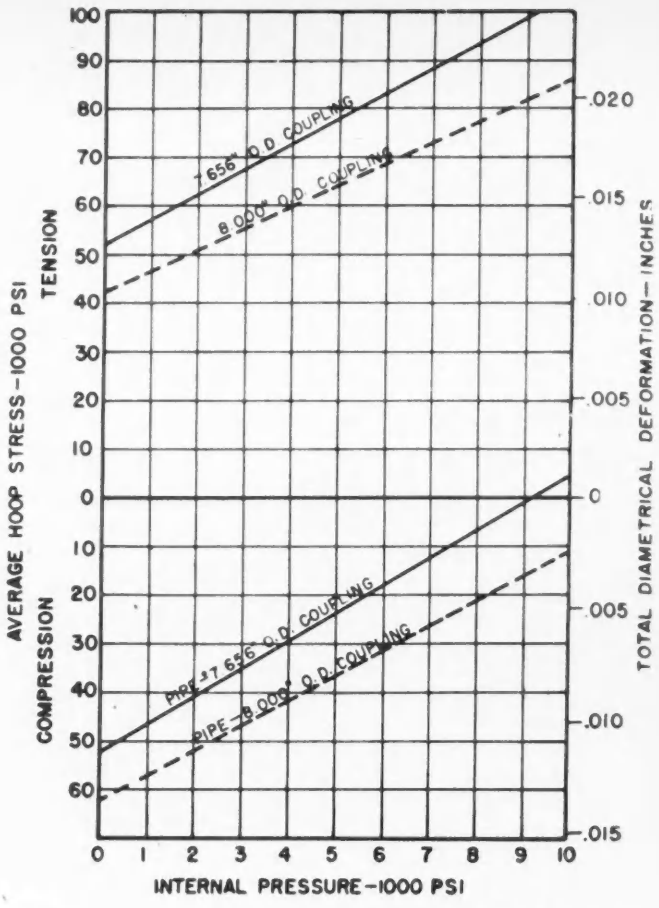


**Figure 2. Average hoop stress at hand tight plane 7-inch by 29-pound casing with three-turn makeup.**

depths of 12½ percent of the wall thickness or flattening alone up to 3 percent of the outside diameter had no perceptible effect on bursting strength. Notches alone, with depths of 12½ to 16 percent of the wall thickness, had very little effect on bursting pressures but failures did begin to localize at the notches.

The critical combination of notching at the axis of the flattened area reduced bursting pressures as much as 70 percent with notch depths of 15 to 17 percent of the wall thickness and ovality of 3 to 4 percent. It is recognized that these deformations are in excess of API allowables, but their practical seriousness becomes more apparent when it is realized that 17 percent of the wall thickness was only 0.054-inches and that 4 percent of the outside diameter only amounted to 0.280-inch. Specimens with lower yield strengths resulted in somewhat less sensitivity to the same degree of notching and ovality, but in all cases the reduction was serious enough to be alarming and to justify precautionary measures to avoid combined flat spots and notches in service.

### High-Pressure Testing

Other important proposals before the API pipe committee are those pertaining to hydrostatic pressure testing. Production from deeper zones has led to a demand for internal hydrostatic testing to increasingly high pressures. An increase of routine test pressure from 3000 to 3300 psi is under consideration and further information is being developed on this subject. Also, there is a proposal under consideration to have all casing tested to produce a fiber stress equal to 80 percent of the specified minimum yield. It is agreed that hydrostatic testing for only five seconds, as now specified by API Pipe Standards, serves as a test for the quality of the material but not as an adequate test of joint tightness.

Both proposals have been passed on for further study due to the limitations of existing production line testing equipment and due to the scarcity and limited capacity of equipment capable of continuous operation in excess of 3000 psi.

Both proposals involve radical revisions or renewal of expensive testing equipment. Further information is required from users regarding maximum test pressures required, and time that test pressures are to be held. It is important that accurate and reasonable values be determined in order to obtain the proper economic balance between field requirements and the burden these revisions will impose on the pipe manufacturers.

A special subcommittee on hydrostatic mill tests has been appointed to collect and correlate information to aid in establishing ceiling pressures for both mill production tests and special mill tests, as well as the length of the testing period.

### Coupling Stresses

The behavior of couplings under various types of loading has prompted analytical investigation of stresses under high internal pressures. At the outset, it is recognized that the result of any analysis depends on assumptions of conditions for which it is made. In this particular case there is a choice of varying combinations of internal pressure and longitudinal loading, and it is possible that to a certain degree longitudinal loads have the effect of reducing hoop tension due to internal pressure. Also there is the effect of thread flank angle toward expanding the coupling. In view of the complex nature of these secondary effects which tend to offset each other, an approximate analysis is presented based on hoop stress alone.

The effect of making up a joint is to expand the coupling and compress the pipe, which is equivalent to pre-stressing the coupling in tension and the pipe in

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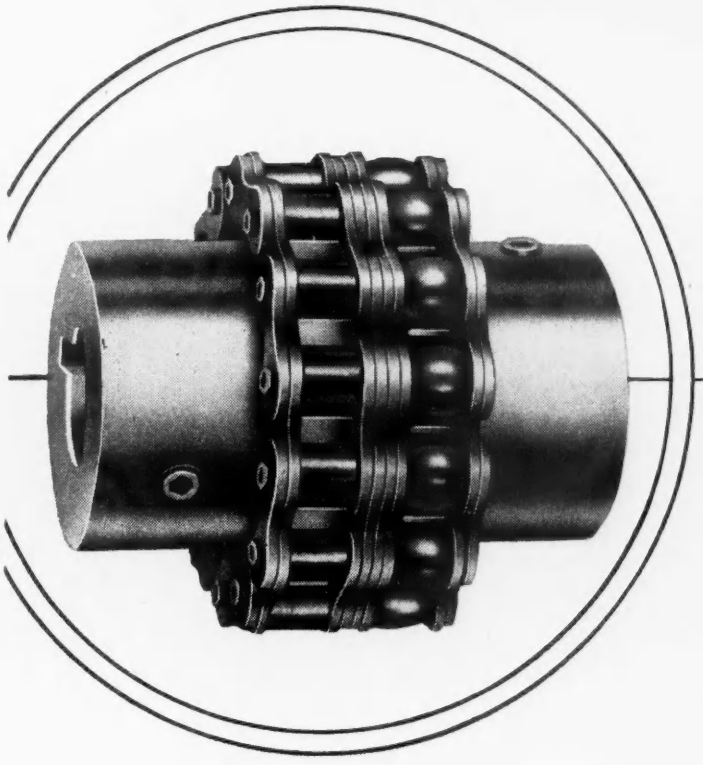

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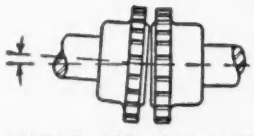

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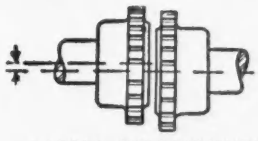

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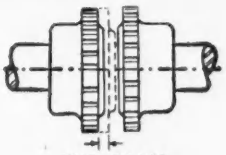

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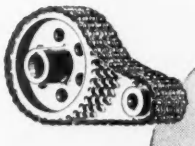

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compression. Then the effect of added internal pressure is to superimpose an expansion on both, with the result that the hoop stresses in the coupling due to makeup and internal pressures are additive.

This condition is shown graphically on Figures 1 and 2 which are based on strain proportional to makeup, starting from the hand-tight position. Actually, a fraction of a turn of power makeup is usually required to eliminate minor variations and bring the threads to "metal to metal" contact, where uniform increase of strain begins. For simplicity, these calculations have been based on coupling and pipe dimensions at the hand-tight plane. The coupling stresses are lower if calculated nearer the end of the pipe and higher if taken nearer the end of the coupling. The theoretical strain and the resulting stress due to makeup are proportioned between the pipe and coupling by the formula for total strain (see Appendix 1).

The hoop stress due to internal pressure is calculated by Barlow's formula (see Appendix 2). It should be noted that the effective thickness in this application of the formula consists of the combined thickness of pipe and coupling. This is true as long as the two expand together, but tests with strain gages indicate that after hoop compression stress in the pipe is relaxed, the coupling stress increases at a higher rate. The indications are that the pipe does not continue to act with the coupling beyond the point of zero stress in the pipe. Instead, the pipe remains relaxed and fluid begins to enter between the pipe and coupling, resulting in all of the hoop load being applied to the coupling at further increased pressures. Such a condition is illustrated by the dotted line on Figure 1, and can be compared with the pipe and coupling acting together as represented by the dashed line.

This may represent the mechanics by which a threaded joint resists leakage. As long as the pipe member is under hoop compression and the thread elements are properly matched, the joint can mechanically resist leakage. It is immediately evident that the higher the makeup stress or the heavier the coupling, the higher the pressure that will be required to exceed these conditions of joint tightness.

For external pressures the initial stresses are the same as for internal pressures. However, as the pressure is applied the tension in the coupling decreases and the compression in the pipe increases. Comparable additive stress values in collapse are generally not critical. This is due to the stress at collapse failure being below the yield strength.

Figure 1 shows the calculated stresses for 7-inch x 29-pound casing with standard API 7.656-inch outside diameter couplings with two and three-turn makeup. Even if a half turn is allowed from hand-tight to completed metal to metal contact, it can be seen that with three-turn makeup and 6000 psi internal pressure, the hoop stress component alone is very near the minimum yield strength of N-80 couplings, disregarding the complex effect of accompanying longitudinal loads.

Figure 2 shows the theoretical comparison of 7.656-inch od and 8.000-inch od couplings on 7-inch x 29-pound casing with three-turn makeup. It is indicated that the 8.000-inch od coupling would have considerably lower stresses, and would be comparable to the 7.656-inch od with only two turns makeup.

The effect of these high hoop stresses has been noted in hydrostatic testing to high internal pressures. Couplings occasionally have been found loose after testing, indicating that some part of the threaded joint had exceeded the elastic limit. This was especially true of N-80 casing equipped with J-55 couplings.

It should be recognized that coupling stress relationships such as indicated by Figures 1 and 2 are more favorable on lighter weights of casing. They are least favorable on 5½-inch and 7-inch casing due to the fact that coupling thicknesses for these two sizes are proportionally less than for the adjacent sizes.

These charts also show that under high internal pressures the total expansion on the diameter (Figure 1) amounts to as much as .020-inch. It is hardly conceivable that this much deformation could be developed without distorting the threads and adding to the tendency to leak. In future test work it appears advisable to investigate possible beneficial effects of reducing total deformation.

It is not the purpose of this paper to recommend a change in coupling dimensions, but the high stresses and strains incidental to high pressure applications indicate that in some instances it may be desirable to increase coupling thickness.

### High-Strength Casing Joints

The design of high-strength joints has been receiving considerable attention from both users and manufacturers. Early developments were centered around the use of internal upsetting to compensate for the metal removed by threading. Later developments have included heat treating, cold working, and combinations of upsetting with the latter two. Conforming to these developments, the API reference to this class of product was changed from "upset joint" to "API high strength joint" at the 1946 fall meeting.

At the beginning the objective of this program was to develop a joint as strong as the body of the pipe, but subsequent field use has indicated that, particularly in the larger sizes, somewhat lower joint strength is sufficient and more practical from the standpoints of clearances and ease of manufacture.

A tabulation of joint strength data suitable for publication for informational purposes has been developed and approved by the API pipe committee. This list will serve as a working basis to aid in development of a final specification and therefore it is important that every prospective user examine it critically as soon as it is published.

For the present this program has been limited to four sizes . . . 5½, 7, 8⅝ and 9⅝-inch. These are listed in J-55 and N-80 grades with both short and long threads and in both upset and not upset treated types. Coupling dimensions remain the same but psysical properties have not been specified, thereby permitting the use of any coupling physical properties which prove to be necessary to develop the desired joint strength. Pipe ends may be cold worked, heat treated, or otherwise processed to increase the physical properties of the steel at the joint, thus allowing as much leeway as possible for further development. The upset dimensions for each size casing have been set tentatively to permit passage of the drift specified for the corresponding size and weight of non-upset casing in order to minimize restriction at the joint.

### Appendix 1

Derivation of average hoop stresses in pipe and couplings (disregarding effect of longitudinal loads).

Nomenclature:

- l = Circumference on centerline.
- d = Tangential total strain.
- D = Outside diameter.
- P = Tangential load (hoop load)
- p = Internal pressure p.s.i.
- t = Wall thickness.
- A = Area per unit length.
- S = Hoop stress.
- E = Modulus of elasticity.
- Subscript "p" refers to pipe.
- Subscript "c" refers to coupling.
- Subscript "Tot" refers to sum of pipe and coupling values for the element involved.

Stresses due to makeup are based on the formula for total strain

$$d = \frac{Pl}{AE}$$

and the assumption that makeup causes constant deformation of the pipe and coupling, such that

$$d_c + d_p = d_{Tot} = (\text{Taper per turn}) \times (\text{turns makeup} \times \pi$$

• CONTINUED ON PAGE 46

# Their Relation to Oil and

# Organization Elements:

## Gas Producing Operations

By J. E. TOUSSAINT
General Manager, Producing Department
Standard Oil Company of California

**A balanced organization is necessary to the successful operation of any oil or gas producing property. Just what constitutes this organization may vary within wide limits, and outside advice may often be secured to provide the occasional amplification of a company's operating personnel. This paper develops the principal factors which must be evaluated to obtain the optimum combination.**

IN THE early days in California, and possibly up to nearly the present day, oil fields were reasonably easy to find, and efficient methods of finding them, drilling them, and producing them may not have been too important. This is typical of any area, and often is typical of any new industry, particularly one involving minerals.

Now it is the purpose here to point out that:

A. Exploration activities quite likely will involve increased risk as to success, and therefore costs of discoveries will be higher because of that.

B. Further, many of the wells will be deep and therefore costly even when efficiently drilled.

C. And, finally, other methods for increasing recoverable reserves, such as pressure maintenance, unit plans, secondary recovery projects, etc., will definitely warrant consideration.

All of these involve planning, investigation, technical advice, and many of the elements that are involved in sound organization for oil and gas producing operations.

### What Does Sound Organization Mean?

Organization means different things to different people. Some think of organization in terms of personalities. Others think in terms of a chart, most any chart. Organization is more than personalities, more than a chart. It is the mechanism through which management directs, coordinates and controls. If the organization is ill designed, the direction, coordination and control is made very difficult, and generally is ineffective. If, on the other hand, the organization plan is logical, clear-cut, streamlined, then direction, coordination and control have a good chance of being effective.

The nature of an organization suitable to any particular activity will vary, depending on the size of the activity and its geographical distribution. Therefore it cannot be said that any particular organization plan is the best. It must be designed to suit the conditions.

There are certain basic concepts, however, of an organization plan that should be kept in mind. I will discuss these toward the end of the paper. My point here is to indicate to you my thinking on sound organization as a background for the further features I will discuss in this paper.

### What Is Meant by Organization Elements?

As previously indicated, there are certain basic concepts of organization that are important, and in an oil- and gas-producing organization there are certain activities that are basic to the industry. These essential activities are what I mean by elements. I might illustrate what I have in mind, both in connection with my statement that there is no one best organization arrangement, and also what I mean by these organization elements, by the following analogy:

To build a house, one must have various construction elements. A foundation is needed. There must be floors. There must be walls. There must be a roof. There must be obvious things if it is to be livable and effective. Now, the size and arrangement of a house varies, as we all know, particularly if we have ever had our wives outline the plans. But a house may be anything from one room to many rooms. Which it is depends to a great extent on the uses to which it will be put. That is why I say there is no one best organization plan, but why certain elements or activities must be given consideration.

I will now mention briefly the activities which I feel warrant definite consideration, and shall make pertinent comments thereon. I will take these more or less in flow diagram order—that is, looking for oil or gas, on up through to the actual production and disposal of the results of production. All of these may not be involved in any particular company. Those that are not need not be given consideration by that company, but I think this would be a good check list to be followed by anyone thinking in terms of an organization plan for oil and gas production operations.

*Geological:* If an organization has no lands and is looking for some that are not already proven or looking for more, it must have geological advice. This can be obtained either within its own organization or on a consulting basis. Which to use will depend upon the particular circumstances.

I might say at this point, that each of these activities I mention will appear somewhat obvious, but as indicated, I hope to provide an effective check list. Further, each of these activities would warrant a paper of its own, so I do not intend to discuss these activities in any particular detail.

*Land and Lease:* If properties are found that appear capable of production, they must be acquired either by purchase or lease, or some other comparable arrangement must be made. Competent advice on such matters is very important, particularly from the viewpoint of titles, conditions

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under which the property must be developed and later operated, etc. Here again competent advice may be obtained either by having it part of the organization or on a consulting basis. Again, which is followed depends on the particular circumstances.

*Construction and Maintenance:* There are involved in getting prepared to drill a well and in its production thereafter, certain construction and subsequent maintenance activities. Under present day conditions, with more modern equipment, it is my opinion that these activities should be planned by suitable technically trained engineers, at least for certain phases of it. Here again, at least certain parts of it can be handled either within the organization or on a consulting basis, depending on the particular circumstances.

I would like to comment here that proper planning ahead of time, in choosing the location, getting water, fuel and roads to the location, and some consideration of subsequent operations, are very important in keeping costs at a minimum.

*Drilling:* The drilling of a well or wells involves suitable equipment and suitable personnel. It should be as far as feasible, adequate for the contemplated work, but one error that I think is made often is the use of equipment which is larger than necessary for the particular operation. This not only affects the investment and resulting depreciation charges, but affects rigging-up costs, operation of equipment (including fuel consumption) and tearing out and various transportation costs. Herein again the drilling can be done within the organization itself or by contract.

In my opinion, there are very competent drilling contractors in California who recognize that they must operate on an effective and therefore competitive basis. Whether one does all of his drilling by contract or part of it, will depend upon the particular situation. If the operator has sufficient drilling activities to keep his basic organization effectively working on drilling, I feel there is a definite advantage in using a combination of one's own organization and contract drilling. However, if one does not have sufficient drilling to warrant a basic organization of his own, then complete contract drilling has its advantages. Here again, there is no one answer to the situation, and the particular conditions will determine the optimum method.

*Production:* Producing oil or gas wells is something that, at least up to the present time, is handled mostly by one's own organization. There are certain features of it, however, such as well-pulling work, remedial work, etc., that can be handled on a contract basis. The extent to which this is done depends again on the particular conditions and there is no one answer.

*Petroleum Engineering:* In both the drilling and production of wells there are many technical aspects on which competent engineering advice is definitely warranted. In the drilling of a well, one very important factor, in my opinion, is the working up of what I term a drilling program. This not only involves the casing program, but involves the determination of the amount, if any, of coring, testing, etc.

If too much coring and testing be done, the progress in drilling a well will be slowed down. If not enough is done where warranted, valuable information will not be obtained. Therefore, I think it is very important that prior to the actual drilling of a well, considerable thought be given to the well program, and this program be made available to the people that have to do the actual drilling.

I do not mean to infer that such a program can be worked out ahead of time and be adhered to 100 percent. Unforeseen contingencies will develop and the program will have to be revised. However, the same type of consideration should be given to the revising of the program as was given to the original plan.

In the production of a well or wells, there are also a number of phases on which engineering advice should be used. For example, when a well should be put on gas lift after it has indicated it will no longer flow, or whether it should be put on pump and when, and a number of other factors, warrant definite engineering analysis.

Further, I think there is already started in California, and we will see much more of it in the future, consideration of pressure maintenance plans, unit plans and secondary recovery projects. These all involve technical features, and competent engineering advice should be available.

## About the Author

J. E. Toussaint was born July 21, 1900. After winning a B. S. in mechanical engineering at the University of California, he was employed by Standard Oil Company of California in 1922, and has been successively engineer, manager of organization and cost control division, assistant general superintendent for the Southern District (Los Angeles basin), assistant general manager, and currently, general manager of operations, producing department, with headquarters at San Francisco. He is national chairman of the API Committee of Wire Rope and Manila Cordage.

On this particular subject of what might be termed "Improved Production Methods" I think it is pertinent to state that this is one definite way to increase the *recoverable reserves* in California.

Another feature related to petroleum engineering is the subject of Production Technology investigations, or what is sometimes termed "Research." I think definite consideration should be given to more of this type work, and in my opinion, an organization that does not plan along these lines will find itself dropping behind seriously.

Petroleum engineering advice may be obtained either by having petroleum engineers in one's own organization or on a consulting basis, depending on the particular circumstances. I think it in order to state that there is a growing number of competent consulting petroleum engineers in California.

The foregoing group of elements or activities is in main basic to oil and gas producing operations. There are elements which I now will discuss that are common to most industries and which are also important in oil and gas production operations.

*Purchase and Stores:* Obtaining necessary materials and equipment on an economical basis, including obtaining them on time, is a very important activity for which provision should be made.

*Trucking and Automotive Transportation:* Trucking and allied services, particularly in drilling activities, are a very important item. It must be correlated with the drilling and production activities. Therefore, in general I think it will warrant proper consideration as a part of the organization. It may be a part of the producing organization or it may be a separate division or department if the company has other activities, or it can be on a contract basis. However, someone in the producing organization should have this as one of the activities for which he is responsible, as this warrants suitable consideration.

*Gas Processing and Disposal:* Most oil wells produce gas along with the oil. This gas has natural gasoline, butane and other hydrocarbons that can be converted to liquid form. The processing of the gas, therefore, is an activity that must be given definite consideration. Here again, whether this is part of the producing organization or separate, or even on a contract basis with some other operator, depends on the particular conditions. However, it is an activity which must be given adequate consideration. Further, the disposal of the residual dry gas or gas from dry gas wells is an increasingly important activity which must be given suitable consideration.

*Accounting:* Paper work is to many of us a sort of a headache. However, a certain amount of it is necessary. This, I

think, is obvious, but I wish to make one point under this heading: Too often the accounting arrangement mixes up financial or corporate accounting with operating or cost accounting. In my opinion they should be as separate as is feasible and economical.

The same accounting organization may handle both, but I think definite consideration should be given to the two different needs. They often can be blended, but there are generally complications. The most important complication that results from improper consideration of this activity is the attempt to have operating and cost accounting information accurate to the nth degree that is necessary for financial or corporate accounting. The result of this is that a lot of time is spent in getting it to this accuracy, which means money; and the most important ill result is that it takes too much time to get the information. Cost and operating information must be readily available to be of real value.

*Organization and Planning:* Whether a separate group is warranted for this activity depends on the size of the company. It is a feature, however, that someone must be giving consideration to, whether it is a group or part of a man's job.

One sets up an organization, which, to the best of his ability, suits the conditions at the time. Conditions change, or the magnitude of the operations change, and it is necessary that the correlative changes in organization be given similar consideration to that which was exerted in connection with the original organization. For this reason, competent advice on this feature from time to time will be found worthwhile.

I have grouped with this also the word "planning." What I have in mind here is future planning, to the extent possible to anticipate organization changes, and to see that planning for all the other activities is given adequate consideration.

### Drilling Forecast

To illustrate what I mean by other planning, I believe it will be found very economical, if, when drilling is contemplated, particularly in a given area, a forecast of future drilling is made and as much work authorized for the drilling organization as can be done at any particular time. This will make it possible to plan ahead on roads, water and fuel systems, crew moves, etc.

In this same group comes the subject of cost studies and methods of analyses. The subject of economic analysis is, in my opinion, quite important. By economic analysis I mean the outlining of various alternatives to accomplish the objectives. There is generally more than one way to kill a cat. These various alternatives should be analyzed from the first cost viewpoint, as well as subsequent operating and maintenance expenditures. By such analysis one can determine the most economical one or two alternatives to follow.

At this point I would like to make this comment: When the alternatives have boiled down to one or two that are so close that complete detailed analysis is necessary to determine which is the best, I think too much time can be wasted trying to do this latter operation. When you get down to a choice of just two alternatives which are very close and probably both good, you can't go far wrong by making a choice of one of them without too exhaustive study.

*Personnel:* Under this heading I have in mind the usual features of selection of personnel at the time they are hired, as well as their training subsequent to hiring. I think the feature of training is very important both to the workmen themselves and to the supervisors. There should be a training program of some sort for the supervisors, as present day conditions require a knowledge of supervisory responsibilities and actions that were not necessary in the past.

*Safety:* It is very important from both a human relations viewpoint and cost viewpoint that safety be given consideration. In general, I am of the opinion that the safe method is the economical method. Safety advice can be obtained either within the organization, if such is warranted, or on the outside. There are quite competent and adequate safety services available on a consulting or contract basis.

*Labor Relation:* I do not think it necessary to indicate the need for someone or a group giving consideration to this viewpoint. Various problems which we have all had with unions, etc., I think demonstrate the necessity for competent advice on this. Here again, whether it warrants a particular circumstances.

*Committees for Coordination:* Committees are often defined as groups that keep minutes and waste hours. That quite often is the case. One can go haywire on the subject of too many committees. I think, however, a reasonable number, properly conceived, and their duties and responsibilities properly outlined, can be very valuable.

Many of the preceding activities I have discussed warrant correlation, and suitable committees that will assist in this correlation are well worthwhile. An illustration of a type committee that I think is well warranted is in the drilling of wells. Geological aspects, petroleum engineering aspects, and what one might term practical aspects, are all involved. A committee that has the duty and responsibility of bringing these elements together can be well worthwhile, and I might state has been found to be well worthwhile.

There are numerous other types of coordinating committees that are justified, but I will not discuss them in detail, as the number of them depends again on the particular circumstances. I do wish, however, to bring out that this subject warrants consideration.

### Some Organization Fundamentals

I indicated earlier in this paper that although there was no particular organization arrangement that could be said to be the best or the right one for all conditions, that I did think there were some basic concepts on organization that were general. I would now like to outline these:

1. This is somewhat repetition, but I would like to state again that there is no best or typical arrangement or chart for all situations. The magnitude of the operations, geological distribution of them, and a number of other factors, bear on this.

2. Whatever organization arrangements you do have or decide on, should be as clearly outlined, however, as the situation will permit. The old philosophy of putting a man on the job and letting him find his place, in my opinion does not apply any more.

There will probably be people who will question that statement. I could, however, furnish adequate references to authority that will concur with my viewpoint. Therefore there should be, for the particular situation:

a. A chart that outlines the particular organization, and
b. For each key position there should be what is termed a "job ticket." This should cover a statement of the basic responsibility of the position, its functions, its relationships and its authority. These should be as clean-cut as feasible under the circumstances.

The prepartion of a folder containing the organization chart and the so-called job tickets, and making such available to each of the key positions in the organization, will be found to be well worthwhile and helpful in coordination. This particular folder is often referred to as a management guide.

3. General type of organization: As a means of making a point, I wish to review this feature very briefly. As is generally known, there are in main three basic types:

a. One is the so-called strictly line organization, often in the past referred to as the "military" type of organization. This latter designation, however, is no longer true, because even the present military organizations are no longer strictly line organizations.
b. Functional type organization: This type of organization is built around the strict idea of specialization and specialists at the head of each function. These specialists then deal with a number of people that involve combinations of these functions in getting their work done. This means that individuals will be receiving instructions

from a number of specialists, and the result is generally confusion. Therefore the strict functional organization is not much in evidence.

c. Line and staff organization: This type organization is a composite of the two previously mentioned. It combines the advantages of each to a great extent, and eliminates the disadvantages of each.

Now, the point I wish to make is this: I think I can say without being too categorical, that this latter type of organization, i.e. line and staff, is the most suitable type for nearly any oil and gas producing organization. However, I wish to make this further caution: Too often in the actual application of this type organization there is failure to suitably distinguish between staff and line activities, and when such failure occurs (that is, suitable steps are not taken), there will be some confusion.

4. Major and Minor Factors: In any organization there are certain activities that are basic and therefore can be termed major. For example, without indicating that the others are not, drilling and production are major factors in an oil and gas producing organization. There are other factors, although important and necessary, that can be termed minor. To illustrate—accounting, stenographic work, etc.

Now, the concept I want to bring out here is this: Too many so-called efficiency experts come to the conclusion that if each and every factor is operating on its most efficient basis, then the composite result is the most efficient situation. It is demonstrable that this is not the case. In other words, it is quite often economical from an over-all viewpoint to have the minor factors operating at less than maximum efficiency in order that the major factors can operate at maximum efficiency. The proper combination will give what I term the "optimum result."

To illustrate, let's take the subject of stenographic work. There may be a number of people in key positions who warrant and require stenographic service. Some efficiency experts think that the best way to provide this is to have a group or pool of stenographers who should be busy 100 percent of the time taking dictation and typing. If such is the case, I think that it can be readily seen that there will be a number of key personnel who would not be able to give their dictation when they wished, because the stenographers were all occupied, and therefore would be delayed or restricted in doing their dictation.

The viewpoint I am trying to bring out is: that it would be better to have stenographers who are not busy 100 percent of the time, so that the key personnal can obtain the necessary stenographic service when required. I hope this illustrates the concept I have in mind. I do not wish to be misunderstood, however, to indicate that I think there should be so many stenographers that they are completely idle the major portion of the time. There is an optimum combination that can be worked out.

I believe I can further illustrate this concept by a story that is supposedly true: A superintendent was conducting a friend of his through his manufacturing plant. While they were making their tour, they came through one room where a group of mechanics were sitting at a table playing cards. The friend inquired as to whether that was the way his employes kept on the job. The superintendent's answer was this: "That's my maintenance crew. The more time they have to play cards, the better I feel, because I know then that all my important equipment is in operation."

I'm not advocating an arrangement that permits people to play cards, but I hope this illustration brings out the concept of optimum provision for major and minor factors.

There are many more features that might be discussed under the heading of organization fundamentals. However, if one is interested in the subject, these can be found in various textbooks and treatises on the subject. I have attempted to cover here four which I think will not be hard to remember, and which cover 99.4 percent of what a person should keep in mind.

### Summary

To summarize the ground which I have covered, I present the following:

1. The situation in California is, or will be, such that sound organization will be quite an asset to assure successful operations.

2. Sound organization from an over-all viewpoint requires consideration of certain basic concepts.

3. There are a number of definite organization elements or activities that warrant consideration in connection with the operation of an oil and gas producing organization. I have presented what I consider most of these, and feel that those I have presented should serve as an effective check list.

4. Important organization fundamentals that warrant consideration are:

a. There is no one particular organization setup that is necessarily applicable to all cases.

b. Whatever organization arrangement is chosen should be clearly outlined by a chart, and there should be a "job ticket" for each key position. A folder containing this information, made available to each of the key positions in the organization, will be found to be well worthwhile and helpful.

c. The line and staff type organization is generally suitable to an oil and gas producing organization.

d. Certain activities of an organization are major and others are minor. It is quite often economical from an over-all viewpoint for the minor factors to be operating at less than maximum efficiency in order that the major factors can operate at maximum effciency —or, in other words—there is an optimum combination.


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## Casing Standards

■ CONTINUED FROM PAGE 45

$$d_c = \frac{P_c l_c}{A_c E} = \frac{P_c l_c}{t_c E}$$

$$d_p = \frac{P_p l_p}{A_p E} = \frac{P_p l_p}{t_p E}$$

$$P_c = P_p = \frac{d_c t_c E}{l_c} = \frac{d_p t_p E}{l_p}$$

$$d_c = \frac{d_p t_p E l_c}{l_p t_c E}$$

$$d_p = d_{Tot} - d_c$$

$$S_p = \frac{P_c}{A_c} \text{ (Tension)}$$

$$S_p = \frac{P_p}{A_p} \text{ (Compression)}$$

Assuming linear stress distribution across the wall thickness, average stress is correct within 5 percent where the D/t of the section is on the order of 20 or higher.

### Appendix 2

Stresses due to internal pressure are based on Barlow's formula coupling:

$$S_c = \frac{{}_pD_c}{2t_{T_c}}$$

Pipe:

$$S_p = \frac{S_c D_c}{D_p}$$

(Note: This approximation makes allowance for the smaller diameter of the pipe as compared to the coupling.)


**REFERENCES**

[1] Robert J. Kettenburg and Fremont R. Schmieder, "Oil-Well Casing Failures," Drilling & Production Practice, 1945.

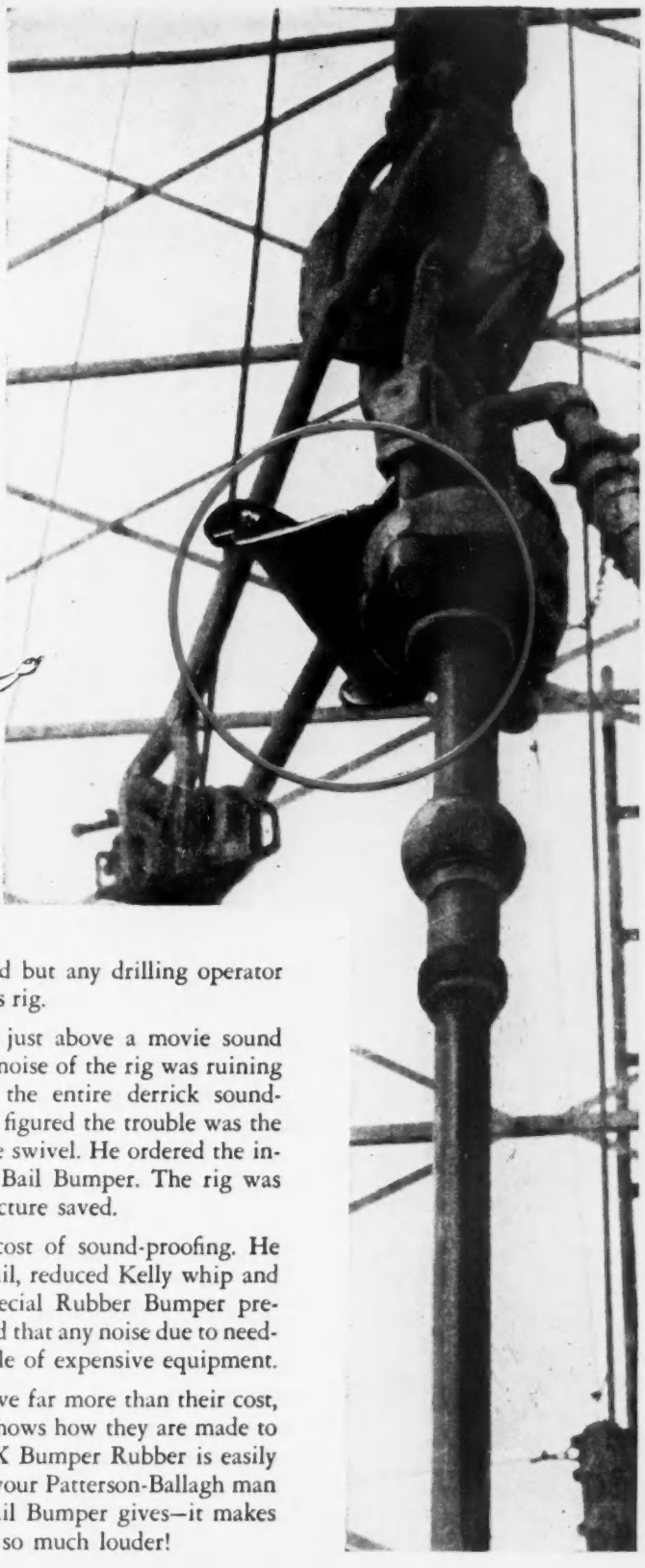
[2] P. D. Thomas and A. W. Bartok, "Leak Resistance of Casing Joints in Tension," Drilling & Production Practice, 1941.


## Oklahoma Flow Boosted

Allocation for Oklahoma crude oil production has been set for 385,000 barrels daily for June by the State Corporation Commission. The allocation is 4675 barrels higher than the May quota and compares with April daily average production of 382,463 barrels. This is the highest allocation in more than a year. Present production is the highest since last July.

# The Movie Director yelled "Quiet!"

## So the tool pusher installed a PATTERSON-BALLAGH Swivel Bail Bumper and got a double pay-off...



**CASE HISTORY No. 27**

*True,* it could only happen in Hollywood but any drilling operator can cash-in on the benefits of silencing his rig.

The operator was drilling on a hillside just above a movie sound studio. The director complained that the noise of the rig was ruining his million dollar picture. He wanted the entire derrick sound-proofed. The tool pusher heard the story, figured the trouble was the sharp clang of the raw bail beating on the swivel. He ordered the installation of a Patterson-Ballagh Swivel Bail Bumper. The rig was silenced, the director quieted, and the picture saved.

The operator saved far more than the cost of sound-proofing. He saved wear and tear on the swivel and bail, reduced Kelly whip and got a smoother operation. The PBX Special Rubber Bumper prevented metal-to-metal shock, and he realized that any noise due to needless raw metal pounding is the death rattle of expensive equipment.

Patterson-Ballagh Swivel Bail Bumpers save far more than their cost, over and over. Your Composite Catalog shows how they are made to fit popular swivel types and how the PBX Bumper Rubber is easily replaced after a long use-life. Order from your Patterson-Ballagh man ... you will enjoy the silence a Swivel Bail Bumper gives—it makes the click of profit dollars in your pocket so much louder!

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# Effect of Dissolved Iron in Oil Field Water-Flood

IRON is one of the most common elements found in the crust of the earth, and of a necessity must be very carefully considered in any flood water treatment program, whether the water source be from wells or the surface, such as rivers or lakes.

In sand and gravel, iron usually occurs as an insoluble oxide in its natural form. However, migrating through these underground strata, water which is low in dissolved oxygen and high in carbon dioxide content reacts with the iron oxide to become a soluble form. This soluble iron is most commonly found in well waters as ferrous bicarbonate, and even though the water may be clean and odorless when first taken from the well, exposure to the air eventually causes a deposit of reddish brown sediment.

Water contained in surface sources is more or less in the same category as well water, inasmuch as the soil which the water has moved through, or over, may prompt the same conversion of iron to a soluble form, still in solution in the water.

The objections to handling high iron content water are readily evident from observing results of handling untreated water for any purpose.

For general household usage, iron content in excess of 0.5 parts per million is objectionable, due to the stain it causes on fixtures, laundry, dishes, kitchenware, etc., whereas many industries such as tanneries, pulp mills, textile plants, etc., limit iron content to 0.1 to 0.3 parts per million or less to prevent staining. In pipe lines, if water being transmitted exceeds this iron content very much, clogging deposits of iron bacteria are deposited on the walls of the pipe. The U. S. Public Health Service Standards recommend iron content be limited to 0.3 parts per million for acceptable drinking water. Although these illustrations apply to other industries and uses than water flooding, it is readily accepted that the same action would take place in water flooding.

The majority of iron-bearing well waters will be found containing less than five parts per million, while some range up to as high as 40 parts per million. These latter waters are classed as exceptions. Acid mine waters are the main contributors to the very high iron content classification, often exceeding 50 parts per million. Iron in this type of mine water is often present as ferrous sulphate.

Whatever the source of water or the form iron is found in it is very definitely desirable to insure a maximum of 0.3 parts per million for trouble-free flooding operations. High iron-content water will not only cause a heavy coating in the distribution system, input wells and meters, but also will deposit on the face of the sand in input wells or be forced back into the sand. Whether the iron is in solution or as an oxide (the well-known iron rust) it should be removed from the water before the latter is used for flooding.

### Dissolving Deposition

Continued deposition of iron in the well bore, or in the sand itself, may not always be removed by backflowing or washing. In such cases it may be possible to dissolve the iron deposition by the use of hydrochloric acid. This is, however, rather inconvenient. The general procedure followed in such an acidizing job is to put the hydrochloric acid solution in the well bore for a period approximating 12 hours, or whatever time is necessary to dissolve the iron. The solution is then bailed out or backwashed. A distinctly alkaline water is then added to neutralize any acid which might affect the tubing.

However, rather than be continually confronted by iron removal problems, both surface and subsurface, most flood operators remove objectionable iron by treatment prior to use.

The presently used basic methods of removing iron are by chemical treatment and filtration, or oxidation and filtration. In the chemical treatment method iron is converted to the insoluble form by the zeolite, lime - soda or lime - treating method and removed by filtration. The oxidation method of iron removal also removes iron by filtration after oxygen precipitates the iron.

The zeolite method of iron removal is rather limited in its use in that the iron must be in the ferrous state for ferrous zeolite to be formed by the reaction of ferrous iron and sodium zeolite. The iron is then removed from the ferrous zeolite by regenerating the zeolite with sodium chloride.

Since ferrous iron is required for this reaction, waters which have been exposed to the air or contain ferric iron will not be affected. Generally speaking the zeolite method of removal is applicable when small amounts of ferrous iron are present and a near zero content effluent water is desired.

In the lime treatment method of iron removal, iron is precipitated in the form of ferric hydroxide and removed by filtration. In this method enough lime must be added to maintain an alkaline pH value and also to neutralize carbon dioxide, since the acidic nature of the latter prompts it to continually combine with the water and form unstable carbonic acid. Then, too, it is difficult to secure the formation of ferric hydroxide in acidic water.

This iron removal method works equally well, generally speaking, through the use of soda ash or caustic soda instead of lime. Treatment is very similar in both cases with enough caustic soda or soda ash being added to neutralize the carbon dioxide and precipitate the iron for filtration in the insoluble hydroxide form.

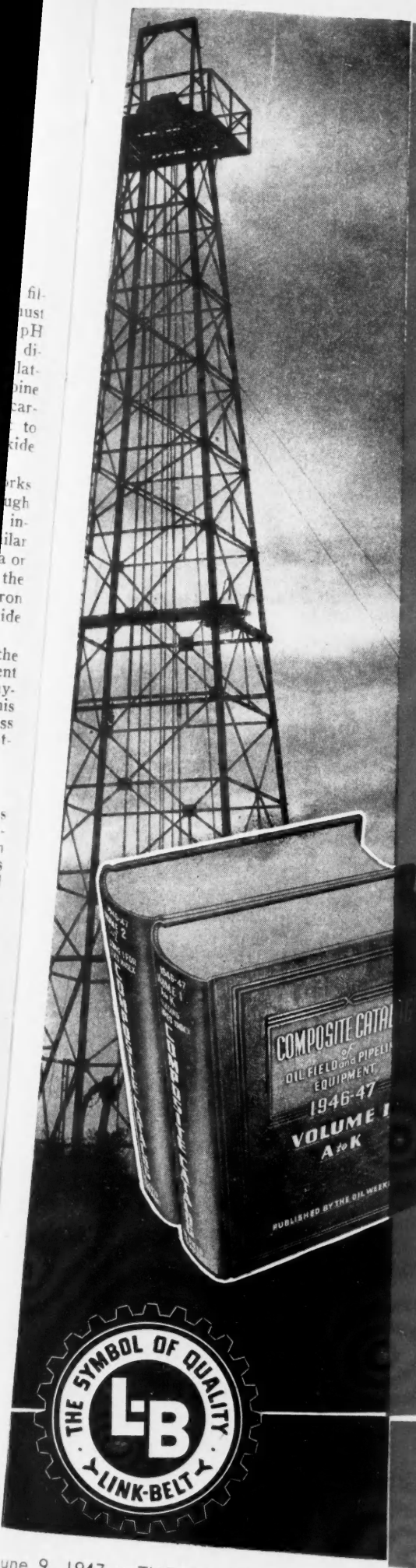
The lime soda method utilizes the same procedure as the lime treatment with iron being precipitated as ferric hydroxide and removed by filtration. This method serves as a combination hardness reducer and iron remover, if such treatment is desirable.

### Aeration of Water

Although simple aeration of water is not always sufficient to oxidize iron completely enough for satisfactory filtration removal, it is used in many instances ahead of the chemical treatment method to minimize chemical usage. By aeration is meant the exposure of the water very thoroughly to the air, which liberates carbon dioxide in solution, thereby increasing the pH, and forms iron oxide when the oxygen in the air combines with the iron in the water. This action forms a ferric hydroxide iron precipitate which may be removed by filtration. Where a small amount of oxygen is needed for this reaction, it is possible to obtain it from hypochlorites, permanganates, etc.

The contact filtration method of iron removal employs oxygen-containing filter bed media and the same reaction takes place as when aeration is applied. The only general difference being that rather uniform water is needed to maintain the oxygen-iron relationship necessary for proper reaction. These filter beds are usually crushed pyrolusite ore, manganese zeolite, or other suitable compound which will furnish enough oxygen to cause complete oxidation or serve as a catalyst between the iron and dissolved oxygen in the water.

The average well-designed flood water treatment plant which must remove considerable amounts of iron is usually based on a combination of aeration and chemical treatment. The aeration causes partial iron precipitation, which minimizes additional chemical treatment required. Chemical treatment is usually resorted to in any event to control other objectionable qualities of the water.




# LINK-BELT OIL COUNTRY EQUIPMENT

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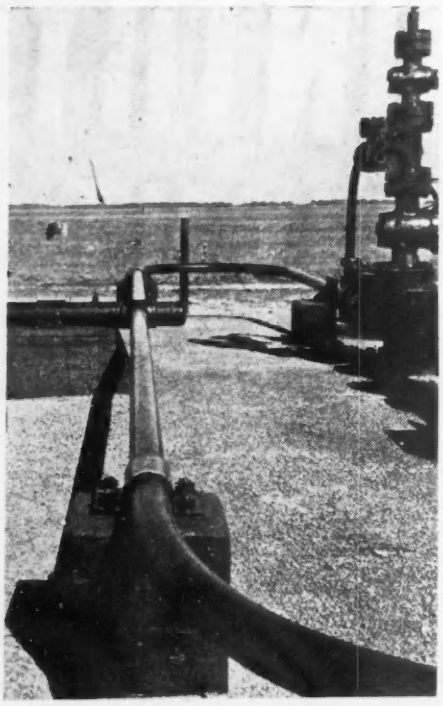
*How To—*

## Compensate Line Expansion with Loop Tie-In



To absorb the expansion changes of the long meter run necessary to eliminate inaccuracies in metering high-pressure gas-condensate wells, one company anchors the run to heavy concrete piers near the meter setting, with other supports along the line so designed as to retain alignment of the line without affecting lateral or lengthwise shifting under temperature changes. The end of the run at the well overhangs its support, the two loops from the Christmas tree being brought in to the tee with long unsupported lengths of pipe so that as the run connection shifts the two connecting lines can spring or flex over their length and thus absorb variations in alignment.

**FLOW LINES**

The concrete bases are so arranged to support all sections of the tie-in and meter run in one plane, and to provide sections which are safeguarded against torsional stresses, but which can shift to absorb length changes without overloading any connections.

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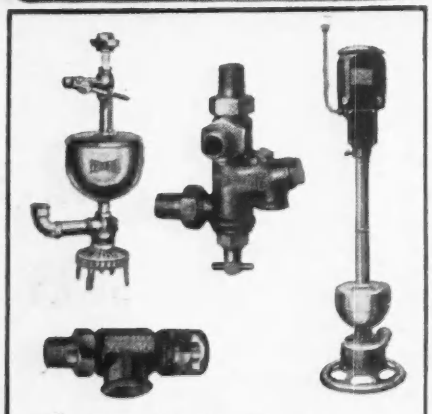

Penberthy injectors—ejectors—automatic electric and water (or steam) operated sump pumps are all widely used throughout the oil industry because they have always been dependable under the most severe service conditions.
All are of rugged construction and made by an organization with 59 years experience in the manufacture of highest quality products.

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*How To—*

## Lubricate Pumping Unit

Where the frame of a pumping unit provides horizontal members which may be used by the pumper when climbing up to oil the main bearing, it is necessary for him to reach over the beam of the unit and grasp the farther flange with one hand while operating the oil can with the other.

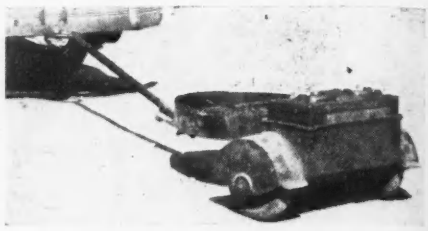
**SAFE PRACTICES**

One producing company emilinates this awkward reach for a handhold by welding a short piece of sucker rod between the two vertical braces welded within the I-beam. This round rod is at a convenient height to be grasped, and though oscillating through a slight angle, the motion is not sufficient to create a hazard.

The grip rod lies entirely within the plane formed by the edges of the flanges of the I-beam, and is thus protected against accidental damage or breaking, at the same time being more advantageously placed for the pumper as he climbs up the cross-braces to a point where he can stand comfortably while checking the lubrication of the main bearing.

*How To—*

## Transport Master Battery

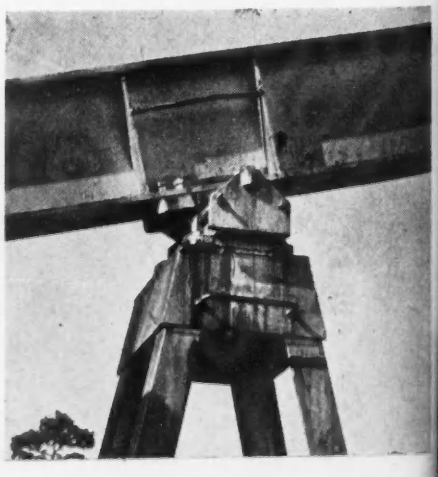


With batteries in the hard-to-get class, one may do the work of several when transportation is arranged so that the "master" battery can be quickly moved from one engine to another or where needed. One production company devised a small battery truck as illustrated to provide an adequate method of moving such batteries from well to well.

**BATTERIES**

The battery truck is made by attaching a pair of motor scooter wheels to a solid axle upon which is welded a battery case with its center of gravity just forward of the axle. Fenders are added to prevent the small wheels from slinging mud, dust or gravel. In case of inclement weather, a metal cover is provided to prevent the battery from becoming wet.

In front of the metal battery case is a semicircular well or recepticle which contains the battery extension cables during transit. These cables connect the battery to the engine starter without removing the battery from the battery truck. A draw-bar equipped with a ring handle for attachment to a trailer hitch of the pumper's car or truck completes the unit. It is light enough to enable the pumper to push the truck to a pumping unit located a shot distance from the lease roads.



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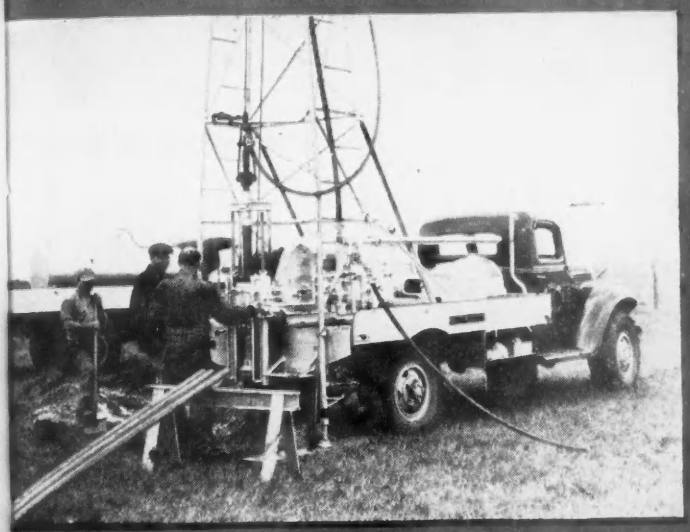

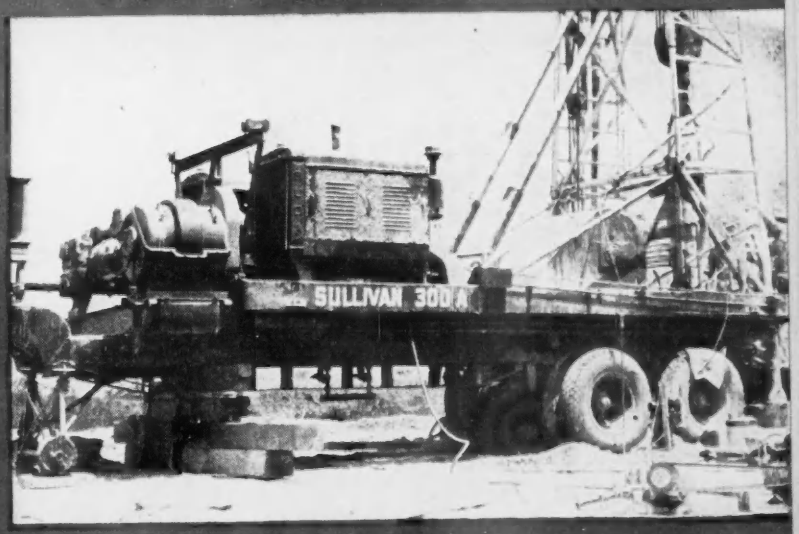


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Page 72



*How To—*

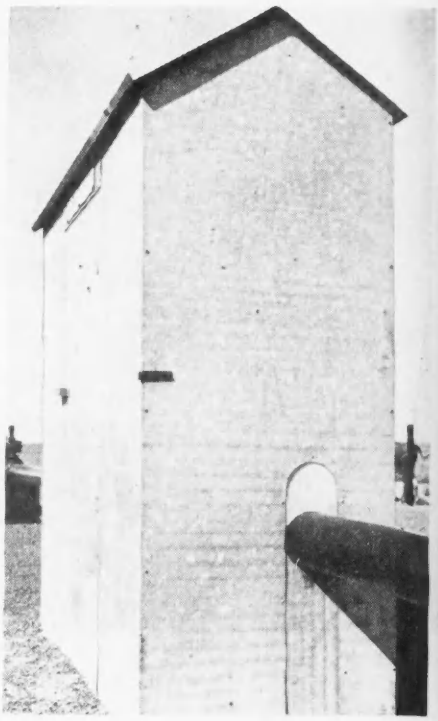
## Weatherproof Orifice Meter Stations

Complete protection for the production meter on a gas condensate well is provided in the Katy field (Texas) by the fabrication of a small house which completely encloses the entire setting.

METER CARE

Long slots in the ends provide for setting the unit over the meter run, while formed filler pieces, cut to conform to the O.D. of the run pipe, are riveted in place after the house is set. The rivets may be easily sheared if, for any reason, it is desired to remove the house after it is once set.

A flange turned on the roof above the door serves as a gutter to prevent rain from flowing down inside the top of the door opening. A latch, shown on the left of the near side of the house in the photograph, engages the door fastener when the door is opened, while a second unit, on the door jamb, permits the house to be locked against unauthorized entry.



***$10.00 is paid for each illustrated acceptable contribution. Mail to The Editor, THE OIL WEEKLY, P. O. Box 2608, Houston 1, Texas***

*How To—*

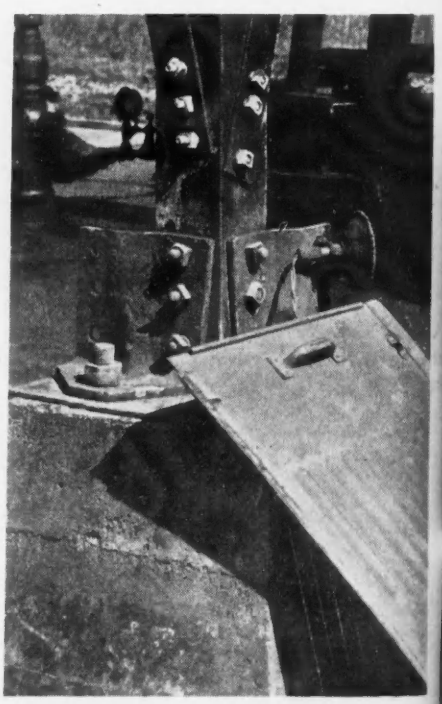
## Provide Light at Well

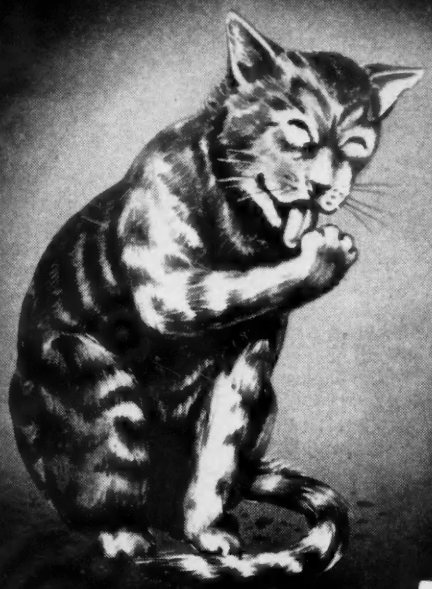
To provide light for repairs to engine or pumping unit on a 24-hour schedule, one company provides a small automobile-type spotlight. The light bracket is bolted to the foundation angle plate across from the engine, and may be swung to direct the beam wherever required on the pumping equipment.

LIGHTING

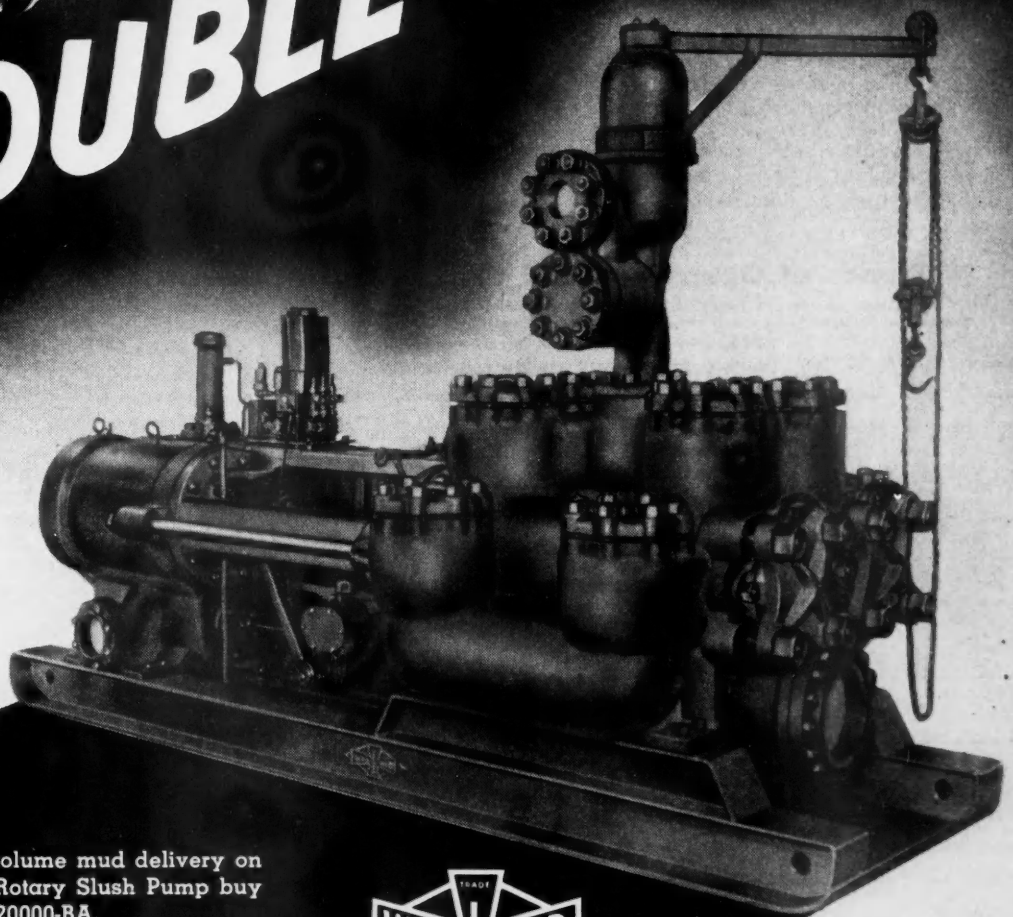
The battery which operates the pumping engine ignition is used as a source of power for the trouble light, a pair of long leads, each equipped with spring clip, being attached to the light terminals. To connect up the battery, it is necessary only to snap one clip on the engine structure anywhere that is convenient, making the other end fast to battery terminal or to the ignition switch lead of the engine circuit.

If, for any reason, the battery on the pumping engine is not available, the leads may be run to an adjacent automobile or truck, and power thus obtained for the spotlight.





# Quick Quiet AND TROUBLE FREE



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## ROTARY DRILLING EQUIPMENT

*Chattanooga, Tenn.*

# Runs to Stills Exceed 5 Million Daily First Time Since War's End

After three consecutive record-breaking weeks, crude production in the week of May 31, leveled off slightly under the all-time peak reached the week before, the API reported. Runs to refinery stills were up to a new two-year high and reached 5 million barrels daily for the first time since the end of hostilities in 1945, when runs were at record levels.

Although crude output in the week ended May 31, failed to hit a new record high, as had been the case in the three previous weeks, it averaged only 1000 barrels a day less than the preceding week's all-time peak of 5,025,000 barrels daily. In comparison with production in the like period a year ago the current amount represented an increase of 268,000 barrels a day or 5.6 percent.

The industry's economists have forecast that for the next 12 months crude production and refinery runs must average 5 million barrels a day to meet the nation's increasing demands for petroleum products. While the producers have been hitting this stride for a month, the refiners have not until now when their charges to stills amounted to exactly 5 million barrels a day. These runs were the highest since the end of the war in mid-August, 1945, when the all-time high of 5,140,000 barrels a day was run.

Stocks of refinable crude continued to build and totaled 237,702,000 barrels on May 24, the highest since early March, 1944, acording to the Bureau of Mines. That total was 15,488,000 barrels or 7 percent over the 222,214,000 barrels being held a year before.

Gasoline production, including natural blended, dropped 218,000 barrels to total 14,709,000 barrels for the week, which was 462,000 barrels or 3.2 percent more than was produced in the like period of last year. Withdrawals of finished and unfinished gasoline totaling 1,951,000 barrels in the week lowered stocks to 95,876,000 barrels, which were only 1,916,000 barrels or 2 percent over stocks of a year ago.

The week's output of distillate fuel oil totaled 5,732,000 barrels, an increase of 214,000 barrels over the previous week's and 800,000 barrels or 16 percent over last year's comparable period.

## Trends of Operations and Changes in Stocks

Figures on crude stocks are from Bureau of Mines weekly reports; all others from American Petroleum Institute weekly reports, which are estimates on Bureau of Mines basis.

**(All figures in thousands of barrels—add 000)**

**HIGHS AND LOWS OF RECENT YEARS**

| ITEM | Crude Oil Prod. Barrels Daily | Crude Oil Prod. Week Ended | Runs to Stills Barrels Daily | Runs to Stills Week Ended | Crude Stocks Barrels | Crude Stocks Week Ended | Gasoline Stocks Barrels | Gasoline Stocks Week Ended | Gasoil and Distillate Stocks Barrels | Gasoil and Distillate Stocks Week Ended | Residual Fuel Oil Stocks Barrels | Residual Fuel Oil Stocks Week Ended |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Highs:** | | | | | | | | | | | | |
| 1942 | 4,337 | 2- 7 | 3,961 | 1- 3 | 263,208 | 3-28 | [1]109,281 | 3-14 | 47,861 | 11-14 | 95,857 | 1- 8 |
| 1945 | 4,944 | 7-21 | [1]5,140 | 8-18 | 227,554 | 10-13 | 99,012 | 3-24 | 45,341 | 11-17 | 56,074 | 1- 6 |
| 1946 | 4,961 | 6-15 | 4,968 | 12-28 | 229,430 | 3- 2 | 105,233 | 2-16 | [1]67,286 | 11- 9 | 61,636 | 11- 2 |
| 1947 | [1]5,025 | 5-24 | 5,000 | 5-31 | 237,702 | 5-24 | 107,576 | 3-29 | 58,034 | 1- 4 | 53,285 | 1- 4 |
| **Lows:** | | | | | | | | | | | | |
| 1945 | 3,621 | 10- 6 | 3,409 | 10- 6 | [2]211,813 | 8-25 | 70,791 | 10-13 | 26,483 | 3-17 | 38,548 | 5-26 |
| 1946 | 4,403 | 3- 9 | 4,498 | 1-12 | 218,193 | 1- 5 | 85,324 | 9-28 | 25,131 | 3- 9 | 37,289 | 4- 6 |
| 1947 | 4,531 | 4-11 | 4,667 | 4-12 | 220,313 | 2- 8 | 94,882 | 1- 4 | 31,470 | 4-19 | 42,668 | 4-26 |

**TRENDS OF 1946 AND 1947**

| Trends in Week Ended | Crude Oil Production Daily | Crude Oil Runs to Stills Daily | Crude Oil Stocks Week End | Gasoline Production Weekly | Gasoline Stocks Week End | Gasoil and Distillate Production Weekly | Gasoil and Distillate Stocks Week End | Residual Fuel Production Weekly | Residual Fuel Stocks Week End |
|---|---|---|---|---|---|---|---|---|---|
| **1946:** | | | | | | | | | |
| January 5 | 4,548 | 4,651 | 218,193 | 14,488 | 98,494 | 5,923 | 35,199 | 8,867 | 42,371 |
| January 26 | 4,626 | 4,553 | 220,544 | 13,622 | 101,737 | 5,720 | 29,498 | 8,411 | 39,722 |
| February 23 | 4,714 | 4,595 | 226,699 | 13,175 | 104,709 | 5,728 | 25,398 | 7,913 | 39,290 |
| March 30 | 4,425 | 4,684 | 224,994 | 13,896 | 104,715 | 5,337 | 28,240 | 8,738 | 37,746 |
| April 27 | 4,672 | 4,685 | 224,443 | 14,228 | 99,631 | 5,568 | 30,466 | 9,204 | 39,404 |
| May 25 | 4,759 | 4,857 | 222,214 | 14,312 | 95,769 | 5,463 | 32,973 | 8,908 | 43,368 |
| June 29 | 4,957 | 4,854 | 223,883 | 14,500 | 92,333 | 5,325 | 37,762 | 8,828 | 46,477 |
| July 27 | 4,926 | 4,896 | 223,756 | 14,535 | 88,626 | 5,817 | 44,316 | 8,217 | 49,517 |
| August 31 | 4,833 | 4,911 | 227,132 | 15,014 | 87,217 | 5,630 | 53,134 | 8,539 | 53,173 |
| September 28 | 4,778 | 4,829 | 223,043 | 14,675 | 85,324 | 5,632 | 59,827 | 8,172 | 57,657 |
| October 26 | 4,730 | 4,758 | 221,184 | 14,863 | 86,423 | 5,710 | 65,499 | 7,728 | 60,872 |
| November 30 | 4,795 | 4,707 | 227,693 | 15,145 | 88,371 | 5,258 | 66,062 | 7,672 | 58,647 |
| December 28 | 4,713 | 4,968 | 225,995 | 15,604 | 93,126 | 5,931 | 58,941 | 8,181 | 53,427 |
| **1947:** | | | | | | | | | |
| January 4 | 4,649 | 4,917 | 223,291 | 15,281 | 94,882 | 5,857 | 58,034 | 8,375 | 53,285 |
| January 25 | 4,672 | 4,820 | 221,655 | 14,624 | 99,801 | 5,630 | 50,357 | 8,224 | 48,558 |
| February 22 | 4,786 | 4,860 | 224,580 | 14,668 | 103,904 | 5,929 | 40,739 | 8,542 | 44,919 |
| March 29 | 4,865 | 4,843 | 227,529 | 14,396 | 107,576 | 5,969 | 32,737 | 8,668 | 43,364 |
| April 26 | 4,930 | 4,725 | 235,383 | 14,213 | 103,860 | 5,435 | 32,286 | 8,186 | 42,668 |
| May 3 | 4,951 | 4,816 | 237,140 | 14,383 | 103,505 | 5,294 | 31,899 | 7,836 | 42,944 |
| May 10 | 5,005 | 4,840 | 236,500 | 14,351 | 100,934 | 5,514 | 33,363 | 8,224 | 42,875 |
| May 17 | 5,008 | 4,867 | 237,303 | 14,522 | 99,793 | 5,662 | 33,844 | 8,217 | 44,390 |
| May 24 | [1]5,025 | 4,970 | 237,702 | 14,927 | 97,827 | 5,518 | 35,212 | 8,292 | 44,499 |
| **May 31, 1947** | **5,024** | **5,000** | ..... | **14,709** | **95,876** | **5,732** | **36,032** | **8,910** | **45,224** |
| June 1, 1946 | 4,756 | 4,826 | [3]222,214 | 14,247 | 93,960 | 4,932 | 33,885 | 8,619 | 43,845 |
| **Change:** | | | | | | | | | |
| In Week | —1 | +30 | +399 | —218 | —1,951 | +214 | +820 | +618 | +725 |
| In Year | +268 | +174 | +15,488 | +462 | +1,916 | +800 | +2,147 | +291 | +1,379 |
| In Year | +5.6% | +3.6% | +7.0% | +3.2% | +2.0% | +16.2% | +6.3% | +3.4% | +3.1% |

[1] All time peak. [2] Lowest since December, 1921. [3] Stocks, May 25, 1946.

## *Prices Show Effects of Continued Heavy Demand*

Fuel oil prices ranged higher on the North Atlantic Coast and in West Texas following increases in the early part of the week as demand for all products continued heavy in all areas. With inventories low and demand increasing, Pennsylvania's gasoline prices are beginning to show the effects of the recent crude price hike in that area.

Prices for No. 2 fuel oil at New York harbor ranged higher when one supplier reported making barge-lot sales at 7 cents, as a result of increased quotations for No. 2 at the Gulf. This same supplier remarked that he had been offered a premium of .25 cent over this price by Canadian buyers. Residual fuels remained tight at New York and one supplier reported an advance of 13 cents to $2.80 per barrel in his price for 0-10 pour No. 5 fuel. However, this raise did not change the range of $2.57 to $2.85 per barrel in this area. An increase of 10 cents to $2.32 per barrel was made in postings for No. 6 and Bunker "C" fuels by another New York supplier.

A West Texas refiner reported a 10 cents advance in his No. 6 fuel posting to $2.20 per barrel and reported a sale of five cars for immediate shipment at that price. Another refiner continued to quote $2 per barrel for this fuel, making the price range from $2 to $2.20 a barrel. A new price range resulted in West Central Texas No. 6 fuel oil as one refiner upped his price 10 cents to $1.65 for the low and another boosted his 10 cents to $1.95 a barrel for the high.

An advance of .25 cent from 8.75 to 9 cents in regular-grade gasoline price and a one cent raise in lube prices were reported in the early part of the week by a refiner in the lower field of Western Pennsylvania. The recent 14 cents increase in Pennsylvania-grade crude was given as the reason for these increases. This area's regular gasoline prices range from 8.75 to 9.25 cents.

The crude supply on the Gulf Coast remained tight and speculation continued on the possibility of a raise in crude prices. Majority of the Coast suppliers agree that an increase would not be advisable at this time and that it would not produce more supplies. One supplier in this area reported that he lost a supply of 3000 barrels a day because he was unwilling to pay a 10 cents a barrel premium.

## • Oklahoma

### *World's Deepest Test Again Fishing; New Okfuskee Pool*

World's deepest test fishing for cones at 17,711 feet; Gulf completes 1200-barrel producer in Garcreek pool; West Holdenville field extended to south; prospective extensioner of Witcher gas area testing; Noble County offset to discovery flows 110 barrels per hour; new oil pool looming for Okfuskee area.

**Caddo County:** The world's deepest test, Superior Oil Company of California's Weller 51-11, NW NW NE 11-8n-12w, five miles north of Fort Cobb, is fishing for one cone lost off a drilling bit. This will necessitate running a junk basket before drilling can be resumed. Total depth is 17,711 feet.

**Seminole County:** The Gulf Oil Corporation has completed a 1260-barrel well in the Garcreek pool. The Yeager 1, SW NW NE 17-10n-7e, has been choked down to the field allowable of 250 barrels daily, with flow coming from perforations at 3690-94 feet. Total depth is 3748 feet with 7-inch casing set at 3734 feet. The well flowed 1260 barrels per hour on initial tests.

**Hughes County:** The West Holdenville pool apparently has been extended a half-mile south by R. W. Brown's Witty 1-B, NW NE NE 21-7n-8e. Gilcrease sand was topped at 3069 feet, where good saturation and stainings were encountered. Total depth is 3081 feet in the Gilcrease, and casing has been set at 3066 feet. Tests continue.

**Oklahoma County:** Testing is continuing at Peppers Refining Company's Parks 1, CSW NW 20-13n-2w, ½-mile west of the discovery well of the Witcher gas field. Bartlesville sand was found from 6106-26 feet, and the unconformity zone at 6150-68 feet, both showing staining and odor. Hole was carried to 6225 feet in the Hunton lime section, and pipe set on bottom. Hunton was found dry and crews are perforating in the two upper zones. Discovery well is a gas-distillate producer.

**Noble County:** A southwest offset to the discovery well of the South Ceres pool averaged 110 barrels of oil per hour for three hours through open tubing on a recent test. Sohio Petroleum Company's Schemmer 1, NE NE SE 34-23n-1w, south of Ceres townsite, is flowing from the Bartlesville sand zone at 4461 feet, which is about 10 feet higher than in the discovery well. Total depth is 4478 feet, with casing landed at 4461 feet. The well averaged 21 barrels of oil an hour through a 5/16-inch choke for 13 hours, and 10 barrels per hour through a 14/64-inch choke.

**Okfuskee County:** A new oil pool apparently will be opened north of the Wetumka pool. Texola Drilling Company et al's Canard 1, NW NW SW 33-10n-10e, picked up the Hunton lime from 3886-915 feet, showing good oil staining and a strong gas odor. Gas was recovered on a drill stem test, 3886-915 feet. Crew recovered 150 feet of oil-cut mud in the tool although no free oil was noted. Testing continues.

## • Kansas

### *Wildcat in Meade County Holds Production Promise*

Promising wildcat may give Meade County first oil production; Texas Company starts wildcat in Thomas County; Marion County wildcat has gas show in chat; Trego County wildcat abandoned.

**Meade County:** A wildcat, 50 miles from oil production appears likely to open a new oil pool, giving Meade County its first production. Helmerich & Payne, Inc., et al's Adams 2, CSE SE 36-34s-30w, in the extreme western portion of the county and about 25 miles east of the big Hugoton gas field, logged good saturation in the Mississippian at 6400 feet, and crews were to drill in and test. Winfield sand was topped at 2702 feet, the basal Morrow sand (Mississippian) at 5880 feet, and the Mississippi lime at 5904 feet. A drill stem test in the basal Morrow sand, from 5875-5992 feet, with tool open 15 minutes, recovered 2½ million feet of gas. Spotted saturation was noted in the Genevieve sand from 6195-6203 feet, but drill stem tests in this zone failed because packer wouldn't hold. Seven-inch casing was set at 6400 feet in the Fredonia section of the Mississippian, which is total depth. The Texas Company owns a fourth interest in this 16,800-acre block. The wellsite is approximately five miles north of the Adams Ranch gas pool.

**Thomas County:** The Texas Company has started operations at the Meeks 1, wildcat in SE SE SW of 36-8n-31w, 26 miles west of the Studley Southwest pool of Sheridan County, and 24 miles southeast of Colby. Drillsite is on a block of 13 sections held by the company, running 12 miles east and west.

**Marion County:** A good show of gas has been encountered in the Mississippi chat at W. C. McBride, Inc.'s, Dole Heirs 1, SW NW SW 7-19s-1e, northwest of Lehigh. Show was encountered at 2865 feet on a drill stem test. Operators will drill ahead to the Viola lime before further testing of the chat zone.

**Trego County:** Bridgeport Oil Company has abandoned the Egger 1-A, NW NW NW 12-13s-21w, a mile south of the Ellis pool, on the Trego-Ellis county line. Total depth is 3887 feet. Topeka lime was topped at 3176 feet, the Heebner sand at 3423 feet, Lansing lime at 3456 feet, conglomerate at 3820 feet, Regan sand at 3872 feet, and granite at 3884 feet.

## Wells Completed in the United States in Week Ended May 31, 1947

**Data preliminary and subject to revision. Revised and more complete data on all completions and exploration shown in monthly summaries published in last issue of each month.**

| State or District | FIELD COMPLETIONS: New Wells: Oil | Dist. | Gas | *Input | Dry | Total | Old Wells Deepened | EXPLORATORY COMPLETIONS: Oil | Dist. | Gas | Dry | Total | ALL COMPLETIONS: This Week | Last Week | This Week 1946 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Arkansas | 4 | 1 | | | 4 | 9 | | 1 | | | 3 | 4 | 13 | 5 | 3 |
| California | 22 | | 1 | | 1 | 24 | | | | | 6 | 6 | 30 | 33 | 42 |
| Colorado | 3 | | | | | 3 | | | | 1 | | 1 | 4 | 3 | 3 |
| Florida | 1 | | | | | 1 | | | | | | | 1 | 1 | |
| Illinois | 15 | | | | 14 | 29 | 1 | 1 | | | 6 | 7 | 37 | 21 | 39 |
| Indiana | 5 | | | | 8 | 13 | 1 | 1 | | | 2 | 3 | 17 | 6 | 20 |
| Kansas | 26 | | 3 | | 10 | 39 | | | | | 4 | 4 | 43 | 59 | 47 |
| Kentucky | 5 | | | | 4 | 9 | 1 | | | | 1 | 1 | 11 | 5 | 8 |
| Louisiana | 8 | | | | 3 | 11 | | 1 | 1 | | 6 | 8 | 19 | 21 | 16 |
| N. Louisiana | 5 | | | | 3 | 8 | | | 1 | | 2 | 3 | 11 | 11 | 7 |
| S. Louisiana | 3 | | | | | 3 | | 1 | | | 4 | 5 | 8 | 10 | 9 |
| Michigan | 7 | | | | 4 | 11 | | | | | 6 | 6 | 17 | 16 | 16 |
| Mississippi | 4 | | | | | 4 | | | | | | | 4 | 17 | 5 |
| Montana | 5 | | 1 | | | 6 | | | | | | | 6 | 1 | 6 |
| New Mexico | 8 | | 1 | | 3 | 12 | | | | | 2 | 2 | 14 | 10 | 5 |
| New York | 13 | | 1 | 15 | | 29 | | | | | | | 29 | 30 | 26 |
| Ohio | 6 | | 11 | | 7 | 24 | 2 | | | | | | 26 | 27 | 8 |
| Oklahoma | 28 | | 2 | | 18 | 48 | 1 | 1 | | | 7 | 8 | 57 | 61 | 39 |
| Pennsylvania | 22 | | 17 | 22 | 4 | 65 | | | | | | | 65 | 57 | 59 |
| Texas | 102 | 2 | 6 | | 22 | 132 | 5 | 5 | 1 | 2 | 27 | 35 | 172 | 188 | 187 |
| **DISTRICTS:** | | | | | | | | | | | | | | | |
| 1—S. Central | | | | | | | | | | | 2 | 2 | 2 | 9 | 3 |
| 2—Middle Gulf | 9 | 1 | | | 1 | 11 | | | 1 | | | 1 | 12 | 7 | 1 |
| 3—Upper Gulf | 9 | | 1 | | 2 | 12 | | 1 | | | 3 | 4 | 16 | 22 | 11 |
| 4—L. Gulf-S.W. | 7 | 1 | 1 | | 2 | 11 | | 1 | | 2 | 6 | 9 | 20 | 19 | 36 |
| 5—E. Central | 1 | | | | | 1 | | | | | 1 | 1 | 2 | 3 | 2 |
| 6—Northeast | 6 | | | | | 6 | | | | | 2 | 2 | 8 | 12 | 18 |
| 7-B—N. Central | 6 | | | | 7 | 13 | | 1 | | | 5 | 6 | 19 | 15 | 3 |
| 7-C—W. Central | 4 | | 1 | | 2 | 7 | | | | | | | 7 | 6 | 4 |
| 8—West | 35 | | 1 | | 2 | 38 | 3 | 2 | | | 2 | 4 | 45 | 30 | 43 |
| 9—North | 22 | | | | 5 | 27 | 2 | | | | 5 | 5 | 34 | 59 | 63 |
| 10—Panhandle | 3 | | 2 | | 1 | 6 | | | | | 1 | 1 | 7 | 15 | 13 |
| Utah | | | | | | | | | | | | | | 1 | |
| West Virginia | 6 | | 10 | | 1 | 17 | | | | | | | 17 | 14 | 13 |
| Wyoming | 2 | | 1 | | | 3 | | | | | 3 | 3 | 6 | 7 | 2 |
| Total U.S. | 292 | 3 | 54 | 37 | 103 | 489 | 11 | 10 | 2 | 3 | 73 | 88 | 588 | 583 | 535 |

* Includes salt water disposal wells. [1] Middle Gulf included with Lower Gulf-S.W. [2] East Central included with Northeast. [3] North Central included with North. [4] West Central included with West.

## • Rocky Mountain Area

### Fremont County Test May Be Plugged Back to Tensleep

Hudson structure (Wyoming) test makes water, may be plugged back to Tensleep; location made for fourth deep basin wildcat in southern end of Big Horn Basin; work resumed on two wildcats in Rio Blanco County, Colorado.

#### Wyoming

Stanolind's proposed Madison test on the Hudson structure, No. 3-M Terry, NW SW SW 19-2s-2e, Fremont County, is making 100 percent water and may be plugged back to the upper Tensleep for completion. This well blew out two months ago flowing an estimated 50,000 barrels of water daily, and after casing was run the well was making approximately 100 barrels of 22-gravity oil with 5000 barrels of water hourly. Settling equipment was installed and the well tested 90 barrels of oil and 3000 barrels of water hourly for a short time, but soon went entirely to water.

**Uinta and Sweetwater Counties**—Mountain Fuel Supply Company's two deep operations on the Church Buttes structure in the Green River Basin, southwestern Wyoming, both in the Dakota formation, productive in the discovery well. No. 2 Unit, NE NE NE 22-17n-112w, 5 miles north of the discovery, is drilling below 12,615 feet after cementing 7-inch casing at 12,445 feet. This test reportedly made more than 50,000 Mcf gas on drill stem test of the upper Dakota sand. No. 3 Unit, one mile west of the discovery, is reported fishing drill pipe at 12,960 feet, total depth, in the Dakota. Casing was run to 12,944 feet, and a drill stem test of seven feet of sand in the top of the Dakota showed more than 12,600 Mcf gas daily. The discovery well on this structure tested 36,000 Mcf gas with an estimated 300 barrels of 50-gravity distillate daily.

**Washakie County**—General Petroleum Corporation has made location for the fourth deep basin wildcat on a series of structures in the southern end of the Big Horn Basin, 45-26-G, NE NE SW 26-46n-91w, being scheduled to test the Embar formation at around 10,000 feet. This well is located on the South Sand Creek structure, six miles east of a 10,900-foot Embar lime discovery well completed by General Petroleum on the South Fork structure two months ago.

Drilling activity in this general area was commenced two years ago following extensive seismic surveys by several major companies. Recent production gauges on the three Embar formation wells drilled by The Pure Oil Company indicate that the wells can produce more than 1500 barrels daily, depending upon the volume of gas produced with the oil. This gas contains a large percentage of poisonous hydrogen sulfide and Pure is considering installing a de-sulphurizing plant in the field. Gas produced from the Frontier formation does not contain the sulfide.

Early this year the G & G Drilling Company (California Company et al) made an Embar discovery 20 miles south of Worland field at Neiber Dome. Additional operations on this structure will be started soon now that arrangements for market have been made. The well produced at the rate of 600 barrels of 42-gravity oil per day natural.

General Petroleum's South Fork discovery, between Worland and Neiber Dome, made an initial of 200 barrels of oil daily, with a small amount of gas, when it was completed two months ago. Gas from this well does not contain the poisonous hydrogen sulfide produced at Worland and Neiber, although all fields produce from the Embar lime.

#### Colorado

Phillips Petroleum Company is resuming operations on two Rio Blanco County wildcats shut down last fall. The No. 1 Unit, SE NW SE 10-2n-88w, on Poose Creek is at 6510 feet, total depth, in the lower Pennsylvanian. Twenty miles west on the Yellowjacket structure the company is rigging up on No. 1 Unit, NW SE SW 1-1n-92w, which is at 3660 feet, total depth, with the objective Madison formation expected within the next 1000 feet.

Location has been made by General Petroleum for a wildcat to the Weber formation at around 7500 feet on the West Douglas Creek anticline, near the Colorado-Utah line. The well will be No. 1 Government, C NE SW 24-2s-103w, seven miles west of a discovery drilled in 1943 by Superior, Continental and Union of California on the Douglas Creek Unit. The Superior et al test was drilled into the Weber at 8558 feet and found that formation hard, tight and dry. The well was plugged back to the Dakota-Lakota at around 4440 feet and gauged 20,000 Mcf gas daily. Superior has an application pending for construction of a 60-mile gas line to Grand Junction, Colo., and considerable development drilling in the field this year is likely.

## • Michigan

### Quarter-Mile Extension Given Kimball Lake Pool

Newaygo County pool is extended; 24 permits issued during week, including four for wildcats.

**Newaygo County:** Rex Oil & Gas Company's Johnson 1, NE NW SE 15-12n-13w, flowed 200 barrels oil in 2½ hours from Traverse lime pay at 2382 feet to extend the Kimball Lake pool another quarter mile south for a proven field depth of one mile. It showed a reported 15- to 20-foot drop in structure, however, to indicate possible field edge.

On the north side of the field, a quarter mile beyond completed wells, Daily Crude Oil Company's Purcell 1, SW NE NE 10-12-13w, cored Traverse at 2383-90 feet and showed 200 feet of fluid. Test was reported 30 feet low on the producing horizon. Ten producers have been completed by Sun Oil Company since discovering the pool in January this year.

### Mississippi Taxes

April severance taxes on oil in Mississippi ran slightly higher than for March according to figures released by the State Tax Commission. Total collections in April amounted to $266,833 from the sale of 2,720,484 barrels of oil and condensate for a daily average collection of $8,894.44. March collection was $259,874.13.

## • Illinois Basin

### Five Discoveries Showing Area; New Indiana Pool

Producers reported from five new areas, one in Indiana; new pay horizon for West Franklin pool.

**Clay County:** Evans and Barrow's Stanley 1, NW NE NE 35-5n-7e, three-fourths of a mile north of the North Hoosier pool, is complete for an initial on pump of 75 barrels of oil in 24 hours from McClosky lime at 2945-50 feet.

A. J. Slagter's Tackitt 1, SW SW SW 36-3n-5e, a mile southwest of the Kenner pool, has pipe set to Rosiclare at 2875-80 feet and McClosky lime at 2930-40 feet. During a one-hour drill-stem test, the Rosiclare showed 360 feet of oil and 20 feet of oil-cut mud. The McClosky was given no drill-stem test.

**Franklin County:** Harry Ames' Thompson 1-A 30-7s-3e, is giving the West Frankfort pool a new pay horizon. Well showed 60 feet of oil and 120 feet of oil-cut mud during a drill-stem test of Aux Vases sand at 2705-25 feet.

**White County:** Joe Reznik's Grant 1, SW SW SE 13-7n-9e, one and a half miles east of Herald pool, initialed 250 barrels of oil in 24 hours on pump from Waltersburg sand at 2290-2300 feet to open a new area.

**Wabash County:** R. B. Martin's Higgins, 1, NW NW NW 36-2n-14w, two miles northwest of Lancaster Central pool, is showing for an excellent well. When a drill-stem test of McClosky lime was made at 2890-2905 feet the well made gas in seven minutes and 1640 feet of oil in one hour.

**Edwards County:** Inland Producers' Harms 1, SE SE NE 19-1s-14w, two miles northeast of Albion pool, pumped 498 barrels of oil in 24 hours from Cypress sand at 2710-20 feet. Test was made through casing perforation after pipe was set to 2790 feet. Total depth is 3126 feet.

#### Indiana

**Gibson County:** C. A. Lynch's Fleenor 1, NW SE SW 22-3s-12w, swabbed 98 barrels of oil in nine hours from Waltersburg sand at 1870-80 feet to open a new area 2½ miles west of the Owensville pool.

#### Kentucky

**Henderson County:** C. E. O'Neal's Fellows 1, 16-O-23, three-fourths of a mile south of the Cairo pool, swabbed 11 barrels of oil per hour from Waltersburg sand at 1740-55 feet. Operator is preparing to shoot the well for additional testing.

### Review of Producing Gas By Burning Coal Is Set

Representatives of the oil and coal industries will be invited by the Bureau of Mines to attend a conference in Washington June 11 at which the results of experiment in producing gas by burning coal in the mine will be reviewed and means discussed for continuing the research.

The experimental mine burning at Gorgas, Alabama, has been halted. But the results were considered so successful that the bureau will make efforts to go into the possibilities of this form of gas production on a larger scale.

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| Fullerton, Texas (Andrews County) | Odessa, Texas |
| | Okla. City, Okla. |
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| Great Bend, Kan. | Refugio, Texas |
| Hobbs, New Mex. | Rangely, Colo. |
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# MID-CONTINENT Supply Company

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## • Ohio

### Miley Crossroads Pool Extended Half Mile North

Miley Crossroads extended north; largest Medina producer found; Newburg gas in Canaan; additional wells in Hemlock Grove.

**Holmes County:** Ohio Fuel Gas Company's Myrtle Lake 1, SW NE 32, Ripley Township, extended the Miley Crossroads pool ½ mile northeast to connect this pool with the Big Prairie gas pool to the north. Three Clinton sand lens were drilled with a pay of 1,300 Mcf gas natural in the bottom lens at 3165-71 feet.

**Muskingum County:** Preston Oil Company's George E. Shilling 1, NW NE 9, Salt Creek township, which had been pumping a small production from the Clinton sand since 1944, was drilled down to the Medina. Top of the sand was reached at 4162 feet, drilling stopped at 4174 feet and then shot. In 24 hours the well flowed 60 barrels and swabbed an additional 20 barrels, the largest initial production for a Medina sand well yet found.

**Wayne County:** While drilling a test in northeastern Canaan township, Ditch et al ran into 10 feet of good Newburg sand that made 750 Mcf gas natural. The test, on Harry Gerstenschlager, SE NE 3, logged the sand at 2737-2747 feet.

**Meigs County:** Hemlock Grove pool continues as a major producer of Pennsylvania grade crude with new wells being added each week. Preston Oil Company's H. R. Cook 4, SW NE SE 2, flowed 33 barrels in 22 hours after shot, and Preston Oil Company's H. R. Cook 7, NE NE SE 2, flowed 30 barrels and swabbed 16 barrels in the first 21 hours after shot. Twelve rigs are running in the pool.

## • Mississippi

### Marion County Gets Gas Field; Producer in Florida

New gas field assured for Marion County; Jones County prospect continues to report shows below 12,000 feet; Sunniland field's first successful completion for 1947.

**Marion County:** Humble Oil & Refining Company's C. Tullos 1, SWc 12-1n-18w, Cottage Hill prospect, 14 miles south of Columbus, has been assured of successful completion as a gasser. Casing was perforated at 9018-30 feet with 96 shots opposite the lower Tuscaloosa zone, and with packer at 8993 feet, well has a slow flow of gas and drill water cut with oil. Perforations were squeezed and casing reperforated at 8996-9003 feet, and with packer at 8970 feet well flowed at the rate of 1780 Mcf gas per day. A small amount of 49.5-gravity condensate also was recovered. Production is being developed from virtually the same level of the same producing horizon as that of the Hub gas field, several miles north. Driller will run tubing and test. S. W. Richardson's Pearl Randall 1, SE SE 18-5n-17w, wildcat is drilling below 7562 feet with no shows. Humble's Ernest R. Ford 1, SEc 20-1n-17w, Tuscaloosa test has reached a depth of 5721 feet with no shows.

**Warren County:** Amerada Petroleum Company's Dabney-Bonelli 1, SWc 9-18n-2e, wildcat is preparing to set casing and drill ahead after reaching 4584 feet. The prospect thus will work below levels ordinarily regarded as being potentially productive.

**Jones County:** Gulf Refining Company's L. L. Majors 1, SEc NE 29-6n-11w, is working below 12,000 feet with slight shows. Cores taken at 12,010-018 feet showed tight calcined sand with good saturation of heavy brown oil. Cores immediately below recovered heavy black oil. A drill-stem test recovered water cushion and mud cut with gas and oil. Botton hole foot pressure was 1400 pounds and hydrostatic pressure 6475 pounds. Coring continues.

**Yazoo County:** Southern Production Company's H. T. Carley 1, NW NW 28-10n-4w, is drilling below 7250 feet after running electrical log at 6907.

**Lincoln County:** Rogers Lacy's Harvey Smith 1, SE NE 17-6n-7e, deep test is drilling below 10,787 feet in the Massive sand zone. Cores at 10,718-728 feet recovered porous ashy sand. No shows have been reported from the lower Tuscaloosa or Massive sand zones. In the Brookhaven field the California Company's Ras Smith 2, SWc 5-7n-7e, is completed with initial production of 381 barrels oil daily. Activity in Brookhaven has reached an all-time high with 46 wells planned or drilling.

#### Alabama

Glen D. Rose' Oil & Gas Company's two First National Bank of Birmingham properties in Walker and Winston counties have been shut down awaiting orders after testing shows of gas between 1200 and 1500 feet. Both wells submitted to acidization jobs.

**Monroe County:** Clint Steinberger's Swift Hunter Lumber Company 1, SE NE 18-8n-7e is drilling below 4450 feet after taking cores at 4160-65 feet which recovered medium-porous sand with moderate salt water content.

#### Florida

**Collier County:** Humble's Gulf Coast Realties 5, SW SW 20-48s-30e, is Sunniland field's first successful completion this year. After drilling to a total depth of 11,578 feet, section was perforated at 11,562-578 feet and acidized with 800 gallons. After swabbing the well failed to flow and additional acid was used, establishing initial production at the rate of 518 barrels of 25-gravity oil per day through ¼-inch tubing choke. Humble's Gulf Coast 9, 24-48s-29e, in Sunniland is testing on the pump after establishing production at 11,566-570 feet. Humble's Lee Cypress Company 3, SE SE 28-47s-29e, is preparing for further tests after drill-stem test following acid job recovered 4500 feet of salt water with shows of oil. Tests are being carried on at 11,871-888 feet.

**Baker County:** Hunt Oil Company's H. L. Hunt 1, NW NE 21-1n-20e has set surface casing and is drilling below it. Humble's Cummer Lime & Manufacturing Company 1, SW SW 36-3s-21e, is waiting on rig. The well probably will be carried to 6000 feet.

**Palm Beach County:** Humble's Tucson Corporation 1, SWc 35-43s-40e wildcat is running core tests below 11,221 feet with no shows from the lower levels.

## • Arkansas

### Union County Reports A Shallow Pool Opener

Union County wildcat completes as shallow pool opener; two other wildcats preparing to test in Union and Lafayette counties.

**Union County:** J. L. Perry, Trustee's Callie Dupe 1, NE NW 13-18s-13w, has been completed and opens a new shallow oil field about 3 miles southeast of the Urbana field. Production is through perforations from 2888-92 feet, total depth 3503 feet. It was gauged as flowing 69 barrels of 28-gravity oil and 39 barrels of salt water daily through 9/64-inch choke. No offsets have been announced.

Arrow drilling Company's wildcat Union Saw Mill A-2, C NW NW SE 8-18s-12w, 4 miles west of the New London field, is drilling at 3502 feet after running electrical survey, which topped Travis Peak at 2964 feet.

**Lafayette County:** McAlester Fuel Company is running casing with total depth of 9082 feet in Lee A-1, C NE SW 24-17s-24w, deep wildcat test.

### Operators Fail to Agree On Unitization at Rangely

Unitization of the Rangely pool in Colorado was postponed pending further study by a technical committee, following a meeting in Tulsa recently attending by six major companies representing approximately 90 percent of the pool holdings.

Differences as to participating interests were said to have been the factor responsible for the failure of the meeting, but such differences likely will be ironed out and unitization eventually effected.

In the meantime operators agreed to return to the original formula for selling their oil which is on a per-well basis and which is being taken by Standard Oil Company (Indiana) which operates the only pipe line in the field.

From the acreage standpoint, The California Company holds the major interest in Rangely.

### West Texas Properties Are Purchased by Hall

G. E. (Blondy) Hall, West Texas producer and drilling contractor, and associates have acquired one-half interest and operating control of Dave Rubin's oil and gas properties in the Texas Panhandle for $795,000 cash. The purchasers have assigned 5 rigs to develop the undrilled acreage, which is reported to involve in excess of 150 proved sites for oil and gas production.

Rubin had completed 20 pumping wells on 7 leases for an allowable of 500 barrels daily in Hutchinson County, and partly developed extensive gas-proved acreage in Hutchinson and Moore counties.

### Geologists Elect

The New Orleans Geological Society has elected officers for 1947 as follows: D. D. Utterback, president; Joe B. Hudson, vice president and chairman of the program committee; D. N. Rockwood, secretary-treasurer.

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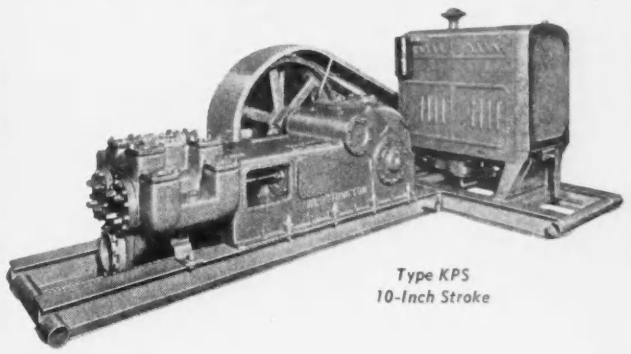

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## • North Louisiana

### *Discovery Opens Important Section in Union Parish*

Union Parish wildcat completes as oil producer, opening important new area; Madison Parish gets new gas-distillate pool; Sabine wildcat has showing of gas.

**Union Parish:** A shallow Nacatoch sand reservoir has been opened by completion of Sellars, Ewing, and Primos' Monzingo-Rivers Lumber Company et al 1, NW SE NE 23-22n-1w, which will take official test. Last gauge on the well was a flow of 8 to 12 barrels of 29.4-gravity oil per hour through 3/16-inch choke, with no accompaniment of formation water. Sellars stated that the well had 16 feet of good pay from 2136-52 feet, and the perforations were made from 2140-45 feet, with 8 shots to the foot. Report that the well died on test and had to be swabbed into production was erroneous. Its total depth is 3490 feet. Sellars is also of the opinion that 20-acre spacing will be necessary and will file application for this spacing pattern.

Offsets are expected to be announced soon, depending on production performance. The area is tightly leased, the lease play beginning some weeks ago after Shell Oil Company completed a core test, C SW SE 14-22n-1w, that was reported to have found several feet of saturated sand. Operators of Monzingo-Rivers 1 have staked location for an offset in C SW SW SW 19-22n-1e, 1¼ miles east and ¼ mile south of the discovery. W. C. Feazel, E. F. Neely, and Roberts Company have spudded in Dyles et al 1, 24-22n-1w, on the 40-acre tract offsetting the discovery.

**Madison Parish:** Marine Oil Company took official gauge of their wildcat gas-distillate discovery, Ayer Timber Company 1, C NW SW SW 19-15n-10e, which was completed flowing 36 barrels of distillate and 1,500,000 cubic feet of gas daily through 3/16-inch choke. Production is from the Tuscaloosa pay, topped at 4927 feet, but perforated at 5631-37 feet.

**Sabine Parish:** Harold Duck has ordered a drill-stem test for his wildcat Peavy-Wilson 1, C SE SW 31-8n-13w. Test will be made of the Fredericksburg horizon, topped at 3470 feet by samples. The well started kicking out heavy rotary mud with evidence of gas and precautions were necessary to keep it under control.

## • South Louisiana

### *Magnolia Coring Below 2400 Feet in Gulf Test*

Napoleonville dome south flank test shut in after testing gas and condensate; Magnolia coring below 2400 feet in Gulf of Mexico wildcat; Queen Bess Island wildcat coring below 15,000 feet; Four Isle dome wildcat drilling below protection pipe.

**Assumption Parish:** Crosby Drilling Corporation's Clifton Land et al 1, outpost on south flank of the Napoleonville dome in 45-12s-13e, has been shut in after testing gas and condensate. Total depth is 5413 feet with 5½-inch casing set on bottom and perforated at 5268-72 feet. On initial test the well flowed gas and condensate with 2150 pounds tubing pressure and 2600 pounds casing pressure.

**St. Mary Parish:** Magnolia Petroleum Company is coring below 2517 feet in hard shale at their State 1 (lease 684), wildcat in the Gulf of Mexico off coast from Pointe Au Fer field. This test has a 3000-foot projected total depth.

**Jefferson Parish:** The Texas Company's Lafourche Basin L. D. 1, wildcat at Queen Bess Island, 1½ miles west of the State 1 gas well in 30-20s-25e, is coring below 15,000 feet. Electric logs have been run to 14,630 feet with no favorable shows indicated. Protection 8⅝-inch casing is set to 12,004 feet.

**Terrebonne Parish:** Superior Oil Company's State 2, Unit 12, wildcat at Four Isle dome, 24-21s-16e, is drilling below protection pipe, set to 10,920 feet.

### *Cycling Plant Is Nearing Completion in Mississippi*

The cycling plant in the Cranfield field in Adams County, Mississippi, is nearing completion and operation should begin about August. The California Company is the principal operator in the field.

The plant will produce propane and rectified condensate. The natural gas and crude will be shipped from the field by pipe line and the propane by truck. Capacity of the plant will be approximately 100,000 Mcf. gas per day.

## • Upper Texas Coast

### *Discovery in Hackberry Extends Field at Orange*

Orange field extended 3100 feet west by new Hackberry discovery; new sand on north flank of West Columbia; Boling south flank confirmation well given potential; Kubela field outpost completed.

**Orange County:** Sun Oil Company's Lutcher-Moore Lumber Company 2 extension, located on the northwest flank of Orange field, has discovered oil production in the Hackberry sands. On potential the well flowed 178½ barrels of 34.1-gravity oil daily through 10/64-inch choke with 750 pounds tubing pressure and gas-oil ratio of 706/1. Total depth is 9005 feet with 7-inch casing set to 8638 feet and perforated at 7589-7601 feet for completion. The Hackberry sands were topped at 7590 feet. This James Dyson League well is 1500 feet due east of the No. 1 dry hole and 3100 feet west of nearest production on Orange dome.

**Brazoria County:** The Texas Company's J. G. Phillips et al 27 has opened new sand production on the north flank of West Columbia field. From perforations at 6633-40 feet the well flowed on potential 766½ barrels of 30.8-gravity oil daily through ¼-inch choke with tubing pressure of 950 pounds and gas-oil ratio of 275/1. Total depth is 7530 feet with 7-inch casing set to 7445 feet. This producer is located 875 feet northeast of Phillips 26 and is in the George Tennille Survey Abstract 131.

**Wharton County:** Sparta Oil Com-


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pany and Mikton Oil Company's A. A. Mullins 2, confirmation well on the south flank of Boling dome, has been given potential gauge, flowing 114 barrels of 29.6-gravity oil daily through ¼-inch choke with 225 pounds flowing tubing pressure and 1125 pounds casing pressure. Total depth is 5160 feet with 5½-inch casing set on bottom and perforated at 5010-22 feet for completion. Location is 400 feet southeast of Cecil Hagen's Mick 1 discovery.

L. M. Josey et al's Bergwall-Montgomery 3, outpost on the west side of Kubela field, has been compelted for a potential of 112 barrels of 24.3-gravity oil daily through ⅛-inch choke. Tubing pressure was 610 pounds, casing pressure 1080 pounds and gas-oil ratio 311/1. Total depth is 4665 feet with 5½-inch casing set on bottom and perforated at 4649-64 feet for completion.

## • Middle Texas Coast

### Pridham Lake Outpost Completed as a Gasser

Wildcat north of Halletsville shows gas and condensate from Wilcox; Matagorda Bay field well completed as gasser; Pridham Lake outpost completed as gas well.

**Lavaca County:** Forest Oil Corporation's H. C. Obelgoner 1, wildcat, 2 miles north of Halletsville in James Campbell Survey 2, showed gas and condensate on a drill-stem test in the Wilcox zone. The test, made at 7510-20 feet, developed 1900 pounds working pressure in 10 minutes and recovered 930 feet of a 1000-foot water cushion plus 120 feet of condensate cut mud, bottom-hole pressure flowing being 3125 pounds. Tests at 7444-55 feet and 7520-30 feet showed salt water. The well cored ahead below 7820 feet following tests.

**Calhoun County:** The Texas Company's State 1 (tract 118), second well in Matagorda Bay field, 4½ miles north of Port O'Connor in Matagorda Bay, has been completed as a gas well and shut in. From perforations at 4716-22 feet the well flowed an estimated 720 Mcf gas daily. Total depth is 5671 feet with 7-inch casing set to 5020 feet. Location is 2354 feet east of the discovery well, the discovery making 192 barrels of 27-gravity oil daily through 3/16-inch choke, through perforations at 4970-78 feet.

**Victoria County:** Taylor Refining Company et al's M. F. Bass Estate 1, outpost located 2300 feet northeast of Pridham Lake field, has been completed as a gas well. The well flowed 20½ million cubic feet of gas daily on open flow, or 2½ million cubic feet daily on ¼-inch choke, with 1710 pounds working pressure and shut-in pressure of 1910 pounds. Total depth is 4948 feet with 5½-inch casing set to 4650 feet and perforated at 4603-08 feet for completion.

**Live Oak County:** Continental Oil Company has set 5-inch liner in Kitty West Burns 1, wildcat 7 miles southwest of George West and 2 miles northeast of Clay West field. Total depth is 10,338 feet with 5-inch liner set from the bottom of the 7-inch casing (set to 8885 feet) down to the bottom of the hole. Location is 1650 feet from the northeast and southeast lines of G. L. Haas Survey A-223.

## • Southwest Texas—Lower Coast

### Oil with Salt Water Flows from Conoco Test

Wildcat east of Rincon field flowing oil with some salt water; Clark's Sullivan City wildcat drilling below 5000 feet after making drill-stem tests; gas and condensate tested in wildcat northwest of Edroy.

**Starr County:** Continental Oil Company's Mrs. O. H. Davenport 5-D, wildcat 1½ miles east of Rincon field, from perforations at 4363-73 feet, on initial test, flowed 62 barrels of 39.7-gravity oil and 18 barrels of salt water daily through ¼-inch choke with tubing pressure of 120 pounds, casing sealed. Total depth is 5000 feet with 6-inch casing set on bottom. The well previously tested gas with oil shows on drill-stem tests at 4348-53 feet and 4353-56 feet.

**Hidalgo County:** J. O. Clark, Jr.'s, Daskam et al 1, wildcat 5½ miles northeast of Sullivan City, drilled below 5000 feet after making several drill-stem tests. One test at 4241-50 feet developed 80 pounds working pressure in 15 minutes and recovered 25 feet of gas-cut mud; a test at 4309-19 feet recovered 1320 feet of salt water; and a test at 4454-66 feet recovered 200 feet of fluid, 20 percent oil and 80 percent mud and salt water.

**San Patricio County:** Southern Minerals Corporation's McGloin 1, wildcat 2½ miles west-northwest of Edroy, tested gas and condensate below 5900 feet. Drill-stem tests at 5954-57 feet developed 400 pounds working pressure in 6 minutes and recovered 5 gallons condensate; at 5957-62½ feet developed 400 pounds working pressure in 5½ minutes and recovered 20 feet condensate; at 5962-67 feet developed 400 pounds working pressure in 7½ minutes and recovered 7 feet of condensate; and at 5967-72 feet developed 400 pounds working pressure in 3½ minutes and recovered 10 feet of condensate. This wildcat cored ahead below 6138 feet following these tests.

**Cameron County:** Ann Lacy and Patsy Lacy's Rogers Lacy Fee 4, extension test located 5330 feet southeast of the Lacy 2 junked hole which lies ½ mile east of the Lacy discovery, has been given potential test. The well flowed 20 million cubic feet of gas daily on open flow, with some condensate, shut in pressure being 4000 pounds.

## • South Central Texas

### Caldwell County Wildcat Tests Oil in Austin Chalk

Wildcat north of Luling tests oil in Austin chalk; wildcat in Burdette Wells area drilling below 2200 feet.

**Caldwell County:** Wiegand Brothers Drilling Company's O. O. Perry 1, wildcat in the Tenney Creek area 9 miles north of Luling, is drilling ahead in the Edwards lime after testing oil in the Austin chalk. The well swabbed two barrels of oil daily from the Austin at 2468-2530 feet. Casing was set to 2468 feet prior to the swab test and the hole acidized at 2468-2530 feet. Location is ½ mile northwest of the Brown 1 well in William House Survey 43.

W. Killam's Rodenberg 2 is drilling below 2200 feet. This Burdette Wells area wildcat is located 150 feet from the southeast line and 350 feet from the northeast line of the 100 acre lease, about six miles south of Lockhart.

**Kimble County:** A cable tool test for the area is Phillips Petroleum Company's W. W. Buck 1, drilling below 400 feet. Twelve-inch surface casing has been set to 20 feet. This wildcat is located in William Berry Survey 373, A-19, 120 feet north of Phillips No. 1 core hole.

### Oil Prospecting Program Slated Soon in Arizona

A state-wide prospecting campaign for oil is reported under way in Arizona, with at least three major companies accumulating acreage for future wildcat tests.

The Standard Oil Company of Ohio, Republic National Bank of Dallas, A. G. Hogue, Inc., and possibly Sinclair Prairie Oil Company are reported entering the state in an effort to locate new reserves.

According to some oil men and geologists, Arizona looms as the last principal undeveloped oil area in the United States.

Test wells will be drilled in Maricopa County, where preliminary exploration is expected to exceed $500,000 in costs. More than 60,000 acres have been leased by the companies, and it is reported company officials are negotiating for an additional 120,000 acres of oil leases, in six areas of the state.

Only one successful oil well has been drilled in Arizona, according to O. C. Williams, state land commissioner. That was near Wilcox in the early 1920's. The well was dug in search for water, but found oil instead after drilling only 700 feet.

Three independent operators have been drilling in the state for some time. They are A. B. Cobb, M. D. K. Fitzwater, and Clifford E. Haines.

### Geological Survey Issues New Oil and Gas Maps

Oil and Gas Investigations Preliminary Chart 27, titled "The Tertiary Stratigraphy of the Jackson Hole Area, Northwestern Wyoming," by J. D. Love may be purchased from the U. S. Geological Survey, Washington 25, D. C., at 60 cents each. It is also available at Geological Survey offices in Casper, Wyo., and Denver, Colo. The chart shows columnar sections of the Tertiary rocks east of Jackson Hole, Wyo.

"Geology of the Western Part of the Ouachita Mountains of Oklahoma," Oil and Gas Preliminary Map 66, may be purchased from the Geological Survey as well as from the Denver office for $1.00 per set of three sheets. It is also available at Room 234 Federal Building, Tulsa.

### War II Plaque Unveiled

A feature of the annual stockholders meeting was the unveiling of a bronze tablet commemorating the 1237 employes of The Ohio Oil Company who were members of the armed service during World War II. The tablet bears the names of the 24 employes who lost their lives in defense of the nation, and will be hung in the main lobby of the general office building as a permanent memorial, it was announced.

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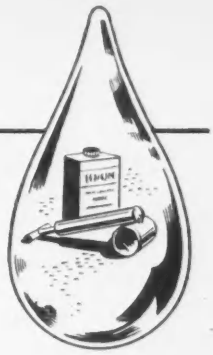

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## • East Texas

### *Big Gasser Anticipated When Deep Well Plugs Back*

Deepest test in district to make gasser after plugging back to the Woodbine; producer and failure recorded for Boynton field.

**Freestone County:** The Texas Company's White 1, west outpost for the Fairfield multi-pay oil and gas field and deepest test in the district was showing for a commercial gasser from the Woodbine after plugging back and testing by stages from 14,331 feet. Drill-stem test of perforations at 4197-4200 feet yielded gas to the surface within ¼ hour and the well cleaned itself of drilling fluid within ½ hour with gas pressure on casing building up to 1200 pounds. A big gasser is anticipated when additional perforations are made below 4200 feet.

**Smith County:** Phillips Petroleum Company's Curry Opal 1, northeast offset to the Boynton field discovery pumped 150 barrels of 35-gravity oil on 21½ hour gauge from Paluxy perforations at 7450-61 feet. Humble's Gary 1, 1300 feet east of the discovery, entered barren Paluxy at 7410 feet with elevation of 448 feet and was abandoned in Glen Rose at 7704 feet.

**Wood County:** Humble's McKnight 1 northeast edge of the Hawkins field is due to become the deepest test in the district and was drilling sandy shale at 14,215 feet. The company's Rio Oil Corporation 1 Yantis Travis Peak prospect, was drilling at 7100 feet in Glen Rose, topped at 6470 feet. The Paluxy beds yielded water and correlate flat with a nearby failure by George Strake.

Amerada Petroleum Corporation and Sun Oil Company's Kenedy unit 1, southeast outpost for the Paluxy pay sector of the Quitman field missed the sub-Clarksville pay and was drilling at 5210 feet to explore the Paluxy.

**Anderson County:** Continental Oil Company and Byrd and Frost's Royall 1, Travis Peak prospect was drilling at 5870 feet, having tested water in the Woodbine. Sanders and Murchison's Broadway 1, three miles east by south of Blackfoot, entered the Georgetown at 5660 feet with elevation of 328 feet.

**Navarro County:** J. L. Collins and Company's Barnett Magnolia 1, Bazette deep prospect recovered light show of oil with water when tester was used at 5385-90 feet and was drilling ahead.

**Henderson County:** W. B. Hinton et al's Ryan Magnolia 1, Tricities field that produces gas-distillate from the Bacon was showing small amount of gas distillate and drilling fluid from Travis Peak perforations at 8588-8685 feet while making an extended swabbing test.

**Marion County:** J. H. Holt's R. M. Gray et al 1, M. G. Hall Survey, indicates a new shallow oil reservoir. The well is said to have pumped 47 barrels of 47-gravity oil per day with small percent of wash water and no formation water. It was perforated around 2730 feet, having logged 18 feet of sand believed to be either Lower Paluxy or Upper Glen Rose, with an additional 10 feet of possible pay around 2300 feet.

**San Augustine County:** M. E. Davis' wildcat W. A. Johnson 1, E. Quirk Survey, is waiting on cement at 8977 feet after finding encouraging shows in the Pettit lime at 8662-8700 feet, where a production test will probably be made.

## • West Central Texas

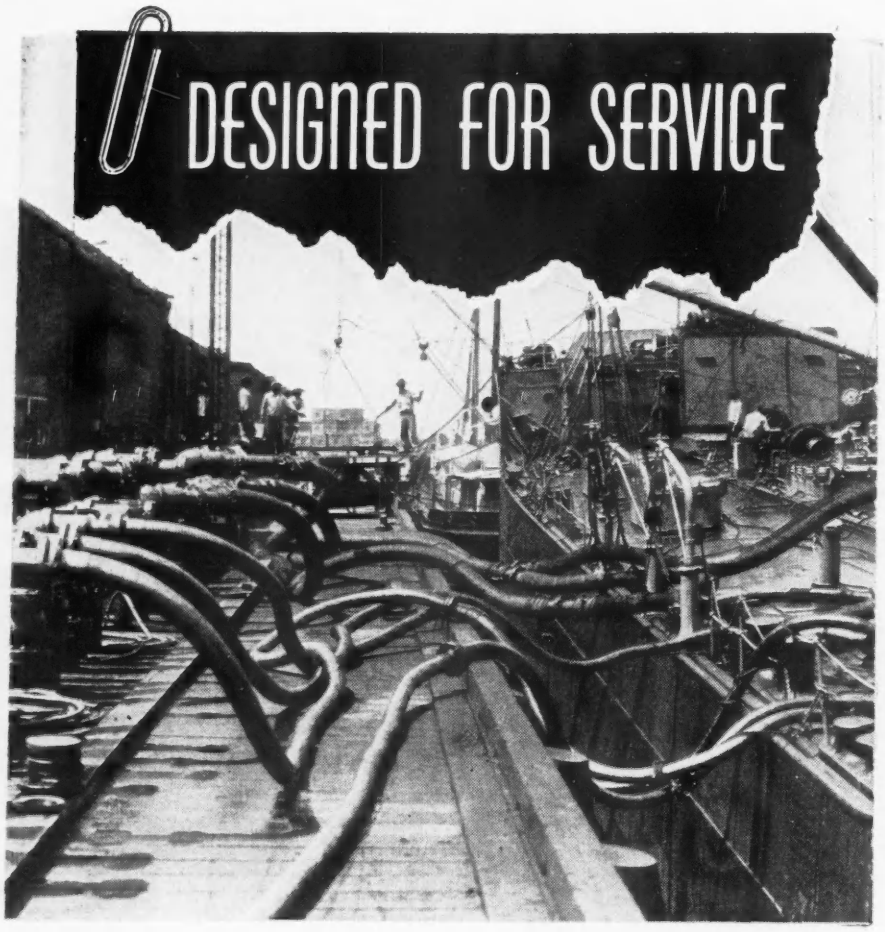
### *Discovery in Isolated Stephens County Section*

Isolated wildcat in northwestern Stephens County showing for oil discovery; east extension in prospect for Kincaid pool, Taylor County; flush production uncovered in old Jones County area.

**Stephens County:** Lloyd Oil Company et al's Eugene Tipton 1, Nancy Williams Survey A-920, situated in sparsely explored sector of the northwest portion of the county, was flowing to clean itself of rotary mud after perforating opposite Mississippi saturation at 4524-32 feet. In drilling to barren Ellenburger at 4713 feet, this wildcat entered the Bend at 3700 feet, with elevation of 1220 feet, and tested nominal show of oil at 3705-13 feet.

**Taylor County:** West Central Drilling Company et al's Morrison Texaco 1, NW NE NW T&P 27, Block 16, and east of the King sand oil discovery for the Kincaid pool, was due to set pipe after logging oil pay at 2618-24 feet.

**Jones County:** Walter K. Jones and Byron Jones, Chittenden 5, twin to a 3061-foot junked test in the BB field, which was originally identified as the Chittenden area when discovered in 1928, flowed 76 barrels of oil natural in 1 2/3 hours via casing, then gauged 168 barrels daily through 19/64-inch choke.

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## • West Texas

### *Andrews County Reports New Permian Oil Zone*

Outpost for Dollar Hide field uncovers new Permian oil zone; Gaines County wildcat flows after acid treatment; second Silurian completion for North Goldsmith field; third failure pending for Petersburg 1-well sweet oil area.

**Andrews County:** The Pure Oil Company et al's Cowden 1, C SE SW PSL 24, Block A-52, 15/16 mile northeast of the Dollar Hide field, added the Wichita-Albany (Permian) lime as a probable oil source in testing 1860 feet of 41-gravity oil at 6700-80 feet. Second drill-stem test at 6781-6875 feet yielded 130 feet of oil-cut mud without water, and the test was drilling at 6990 feet. Upper Permian markers correlate flat with the highest of the 12 Devonian producers and the Silurian-pay discovery.

**Gaines County:** Honolulu Oil Corporation's White & Shelton 1, 4¼ miles northwest of a recent pumping discovery on the same geological strike, responded to treatment with 500 gallons of acid in flowing 56 barrels of 31-gravity oil by heads on 8-hour test. Multi-acid treatments will follow. Short-term leases will force early explorations on outlying leases.

**Ector County:** Gulf Oil Corporation's Cowden 1, C NW NE T&P 3, Block 45, T-1-N, east offset to the Silurian discovery for the North Goldsmith field, flowed 240 barrels of oil with gas-oil ratio of 1194/1 on 13-hour gauge through ¾-inch choke after using 1000 gallons of acid in Silurian open hole at 8052-166 feet. This confirmation well correlates 184 feet high.

**Coke County:** Union Oil Company's McCutchen 1, wildcat on Robert Lee prospect, was abandoned in water at 6746 feet, having entered the Ellenburger at 6304 feet with elevation of 1921 feet.

Sun Oil Company's Fred Jameson 2, 2950-foot southeast extension for the Jameson field and its fourth consecutive producer, flowed 424 barrels of 47.2-gravity oil, with gas-oil ratio of 1400/1, initial through ¼-inch choke after acidizing perforations at 6306-51 feet and 6365-6400 feet in Crinoidal, topped at 6270 feet with elevation of 2063 feet.

**Crane County:** Gulf Oil Corporation's University 1-HH-E, discovery for the University-Waddell field, was completed in the deepest and most prolific of its 5 oil zones with rated potential of 3236 barrels of 46.3-gravity oil and 2,373,000 feet of gas, or ratio of 733/1, through open 2⅜-inch tubing after using 1000 gallons of mud acid. The potential was based upon 6-hour test, and back-pressure on tubing was 435 pounds. This production is from 7 zones of perforations from 10,615 to 10,875 feet, totaling 150 feet, in Ellenburger, topped at 10,588 feet. Gulf is at work on 2 outposts, and continuous drilling is scheduled.

**Crockett County:** Cities Service Oil Company et al's Owens 1-B, wildcat between the Clara Couch and Olson fields and a failure in Ellenburger at 6960-8264 feet, was testing perforations at 5645-50 feet as preliminary step towards completion in the Crinoidal. This wildcat blew out while bottomed at 5806 feet, making heavy volume of oil, gas and water, and protection string was later


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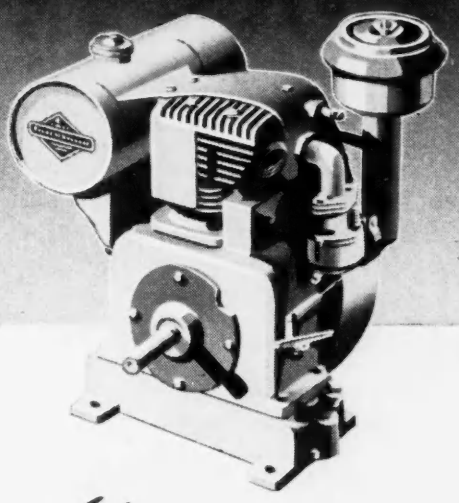

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cemented at 6770 feet to continue to the Ellenburger.

Amerada Petroleum Corporation's University 1-CTA, wildcat, tested water at 8825-40 feet in Ellenburger, topped at 8102 feet with elevation of 2613 feet, and was drilling lime and chert at 8862 feet. No test was made of broken oil pay in the Upper Ellenburger prior to landing 5½-inch casing at 8710 feet. Plans are to deepen to granite for geological information before perforating for production test.

Ted Weiner et al's Vaughn-Richfield 1, Ellenburger prospect, tested dry in Basal Permian at 6586-96 feet, and was drilling at 6680 feet.

**Hockley County:** Amerada's Shofner 1, 1⅞ miles northeast of the Levelland field and structurally low, was drilling dry lime at 4836 feet with danger of formation water within the next 50 feet. Cascade Petroleum Company's Stone 1, 1⅓ miles northeast of Shofner 1, entered the first lime at 3640 feet, or 48 feet low, and was drilling at 3700 feet. No failures have been drilled in the east portion of the field, which is among the most active in the district. Western Drilling Company-Jas. A. Edminston, Jr.'s, Gregg-Texaco 1, Labor 25, League 731, 1 1/16 miles north of Levelland field production, was pulling core at 4801-15 feet.

**Scurry County:** Ohio Oil Company's Neal 1-C, wildcat, swabbed salty-sulphur water after using 1000 gallons of acid in open hole at 7232-90 feet in Ellenburger, topped at 7224 feet, and will deepen. The fluid level remained constant at 3500 feet during swabbing test.

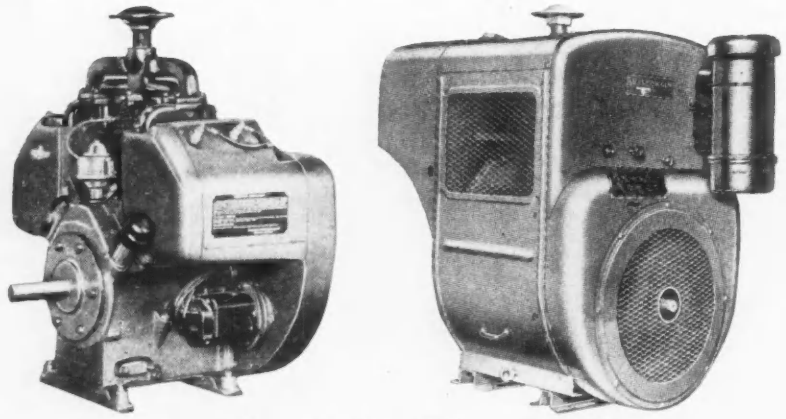
**Terry County:** Amerada's Elkins 1, west offset to its Adair field discovery, was perforating up the hole by stages to establish the water table. Last test at 4910-20 feet yielded 47 barrels of fluid, including 50 percent water. The Company's Posey 1, ⅞ mile northwest of the discovery, was credited with correlating 54 feet low on upper markers, and drilling at 4215 feet.

**Hale County:** Stanolind Oil & Gas Company's Stine 1, ¾ mile northwest of the Petersburg 1-well field and 226 feet low structurally, was abandoned at 7528 feet in dry lime. Standard Oil Company of Texas and Humble's Hunt 1, west by south offset to the producer, was drilling shale at 7131 feet, or 140 feet below the total depth of the discovery, considering elevations. A structurally low failure was drilled to the southeast of the producer.

Stanolind Oil & Gas Company's Hegi 1, 1¼ miles west by south of Petersburg townsite, was drilling dolomite at 5210 feet, while Barnsdall Oil Company's Camp 1, also a wildcat, was drilling at 4525 feet. Glen J. Smith et al's Durrett-Stanolind 1, 1½ miles northwest of the Irish field, was drilling lime at 5120 feet, with elevation of 3441 feet.

### Educational Aid

Liberalization of an educational aid plan, in which employes of The Carter Oil Company of Tulsa may take special high school or college studies and have two-thirds the total cost of tuition, registration and instructional fees paid by the company, has been announced by A. H. Mitchell, personnel manager.

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## • North Texas

### Throckmorton and Clay Wildcats Have Bend Shows

Throckmorton County deep prospect to run pipe for completion try in Bend; Clay County wildcat has thick pay in Bend; semi-wildcat in Montague County due to make pumper.

**Throckmorton County:** Tom F. Hunter et al's Mathews 1, southeast corner of Section 60, Comanche Indian Reservation and offsetting depleted shallow production, was running pipe to complete after indicating commercial production from Lower Bend at 4506-11 feet with elevation of 1363 feet. The prospect is 1 15/16 miles southeast of A. V. Jones-Stasney et al's Brockman 2, which produced briefly from Marble Falls at 4710-61 feet, with elevation of 1320 feet.

**Clay County:** Phillips Petroleum Company's Bryant Edwards 1, B. Redding Survey 45 and 1¾ miles southwest of the Bryant Edwards 5-well field at the same level, was due to make production test after establishing 2 probable oil zones in the Bend, topped at 5925 feet with elevation of 907 feet. Conglomerate saturation at 6070-80 feet yielded steady flow of 41-gravity oil through testing tool, with 2500 pounds shutin bottom-hole pressure. Base of this pay was called at 6080 feet, and oil-saturation lime at 6120-49 feet yielded 43-gravity oil.

Magnolia Petroleum Company's Fisher 1 and Continental Oil Company's Keen 1, both wildcats, were abandoned at 6676 feet and 6518 feet, respectively.

**Montague County:** Pace Petroleum Company, J. M. Garrett and A. V. Grant's Pittman 1, Jas. Ferguson Survey A-261, semi-wildcat for the Capps Corner area, was making production test of broken oil pay at 1984-96 feet, with 7-inch casing at 1981 feet.

Continental's Davidson 1, southwest corner of 50-acre tract, N. S. Ussery Survey and east outpost for the Lewis-Stuart field, flowed 776 barrels of oil with gas-oil ratio of 1118/1 on natural test through ½-inch choke from perforations at 6215-27 feet in Bend lime, topped at 6186 feet.

### Louisiana Hearing

June 12 has been set by the State Conservation Department for a hearing on allowables for Louisiana fields during July and August. A number of individual field problems will be aired at the same time.

## • California

### Santa Barbara Reports Possible Tidelands Pool

Tidelands wildcat may be discovery well of a new under-ocean field off Santa Barbara coast; operations to be resumed in directionally drilled tidelands well at Seal Beach; third well in new Belgian Anticline field makes discovery in Point of Rocks formation; outpost well on west flank of Lost Hills producing oil with large water cut.

**Santa Barabara County:** A new tidelands oil discovery about 2 miles east of

the Elwood field is considered likely as the result of a blow-out in State 309-1, a test well being drilled directionally by Honolulu Oil Corporation. The well blew out from a drilled depth of 3962 feet and was uncontrolled for 36 hours when it was killed with heavy mud. It is assumed that it is bottomed in the Vaqueros formation which is the main producing zone in the Elwood field. The location is adjacent to Coal Oil Point, scene of several promising, but unsuccessful tests.

Sunray Oil Corporation was to test its Los Flores 1 wildcat on the Los Flores ranch, 4-8n-33w, 1 mile southeast of the Orcutt field. The well, drilled to some 6000 feet through the Chert Zone, the main producing zone in the Orcutt field, had good showings in the Chert as well as in a heretofore unknown Miocene sand higher up the hole at about 4800 feet from which 33-gravity oil was recovered.

**Los Angeles County:** Marine Exploration Company (Jergins Oil Company and The Texas Company) is preparing to resume operations in its tidelands well State 1, drilled 1½ years ago from a shore location at Seal Beach. A protection string of casing was set at about 7000 feet after which operations ceased until 2½-inch drill pipe was delivered. The well, near bottom, is about 70 degrees off the vertical, for its depth, porbably the most nearly horizontal hole ever drilled.

Shell Oil Company has resumed drilling below 10,030 feet, where casing was set, in its Long Beach outpost, Dolley 2 in Sec. 29-4s-12w. Test was made of showings in the interval 10,030,-10,119 feet.

**Kern County:** The Texas Company has completed a third well in the Belgian Anticline field which it discovered last October off the southeast end of the McKittrick field. Tulare NTC-One 28 in Sec. 28-30s-22e, is flowing 50 barrels of 43-gravity oil and 500 Mcf gas through a 6/64-inch choke. Whereas the two previous wells were completed in the Oceanic sand, the latest well found that horizon wet but, drilled deeper, it made a new discovery in Point of Rocks sand. Both formations are productive in the Cymric field, a short distance northwest. The new well is a half-mile southeast of the discovery.

Universal Consolidated Oil Company's Lost Hills 18, an attempt to develop production on the west flank of the Lost Hills field in 30-26s-21e, has been producing some oil from 1957 feet, but a large water cut has been reported. A small well is a possibility.

Richfield Oil Corporation's abandoned at 10,030 feet its Berry 1 deep test in the South Belridge area, 30-28s-21e. Belridge Oil Company's 14,100-foot test about 3 miles east also was unsuccessful in finding a deep pay.

**Kings County:** Chanslor-Canfield Midway Oil Company has acquired a 3300-acre lease in the McClure Valley and will locate a test either in 25 or 36-24s-17e.

**Tulare County:** A wildcat will be drilled near Decor in 13-23s-26e by Gene Reid Exploration Company and Luther T. Mayo, the location 1½ miles northeast of a dry hole drilled by Superior Oil Company to 4173 feet. This well had some showings below 4100 feet.

**Orange County:** W. E. Medearis will drill two wells to the Tar Zone in the Huntington Beach townlot field. He is the third operator to undertake shallow drilling for heavy oil in this old area.


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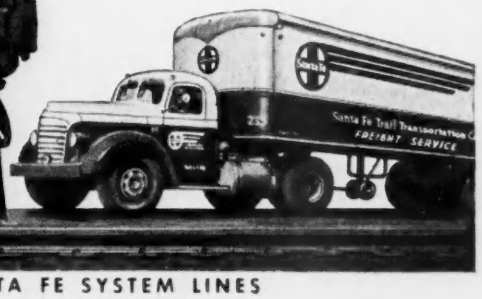

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**I have a block of new 1947 five-year oil and gas leases comprising about 5000 acres following a northeast-southwest fault line, in Guadalupe County, Texas, for a distance of about 12 miles in length and about ½ mile in width running all the way from near Seguin to within 2 miles of the old Luling Oil Field which has produced over 78,000,000 barrels of oil in the Edwards Lime at around 2100 feet depth and is still producing; where, within the last 60 days a well was drilled about 125 feet deeper than the average field depth discovering a new pay of higher gravity oil.**

**I will give 1000 acres of your choice of this block for a well to be drilled to the Edwards Lime, or, I will give 2000 acres for 2 wells; or, will sell either ½ or ¼ of the block checker boarded at $5.00 per acre, the purchaser agreeing to drill one well to the Edwards Lime and I agreeing to drill one well.**

**JOSEPH McCORD**
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**San Antonio, Texas**

# Wanted
# OILFIELD EQUIPMENT SALES ENGINEER

Recognized and leading Engineering Firm handling accounts of foremost Oilfield Equipment Manufacturers in Venezuela and Trinidad, B. W. I., requires the services of Experienced Sales Engineer for work in Venezuela. Man selected should have basic mechanical or petroleum engineering education with sales and practical oilfield experience. The possibilities of this position are unlimited for a man that is not afraid of hard work and with sufficient capacity to assume responsibilities and use his own judgment.

Will have a man in Houston, Texas, to interview applicants from June 16th through June 23rd. Please send applications in own handwriting accompanied by recent photograph giving age, marital status, education, past experience and any other details in which we might be interested. Send replies to Box 61, The Oil Weekly, Houston, Texas.

## SITUATIONS WANTED

■ Petroleum Engineer: 5 years production experience with mid-Continent major operator. Desires affiliation with West Coast concern. Age 28. Graduate chemical engineer, Tau Beta Pi. Write Box 63, The Oil Weekly, Houston, Texas.

**GEOLOGIST OR ASSISTANT GEOLOGIST.** Twenty years with oil companies in various capacities, 2 years geophysical office, 10 years geological office, thoroughly familiar with geological department procedure, some "well sitting" and sample working, excellent draftsman. Two years college work in geology and associated subjects. Member S.E.G. and A.A.P.G. Sober, industrious. Answer: Box 59, c/o The Oil Weekly, Houston, Texas.

## • Canada

### *Princess Area Reports Good Limestone Producer*

Madison limestone well extends Princess area for half mile; Imperial gets fourth success in row at Leduc, a southeast extension adding considerable acreage to the proven area.

The Princess area's first 1947 completion is a Madison limestone oil producer which extends the field a half mile southeast. Activity in this area started the middle of May after a hard winter and four rigs are runnings.

The extension—first completion in the South Princess area since the S.P.S. discovery—is Federal Oil Syndicate 1, lsd 7 8-19-11w4th, organized by H. S. Flock and backed by several majors and independents.

The well cored into Madison lime at 3330 feet, 11 feet higher than the S.P.S. 3, halted 15 feet in at 3345 feet when drill-stem test was run from 3325 feet. The well commenced making gas at a 360 Mcf daily rate, settled to a 10 Mcf rate as fluid entered the 4½-inch pipe. When pipe was pulled after one hour, it was found to contain a 900-foot column of slightly gassy oil, with no evidence of water. Seven-inch casing is being set to the top of the lime, preliminary to putting the well on production.

On basis of drill-stem test, the Federal well compares favorably with the S.P.S. 3, which gave a 960 feet of oil in one hour test, after entering the Madison at 3320.5 feet and completing at 3326 feet. The well is currently being produced through a 7/64-inch choke, with yield about 50 barrels daily, with production to be opened up later this spring.

S.P.S. 3 oil is 27.2-gravity and that at Federal appears to be of comparable quality.

At Leduc, Imperial Oil Ltd.'s fourth success in a row is a southeast extensioner adding a mile width to the 3¼-mile line of production. The new well, Imperial-Leduc No. 4, lsd 16 15-50-26w4th, on basis of drill-stem tests, is comparable with Imperial 1 discovery and the Nos. 2 and 3. No. 4 is another No. 2 zone producer, reaching this section at 5335 feet. Drill-stem test of 17-foot section to 5352 feet gave gas at a rate of 3000 Mcf daily plus an oil flow through the 4½-inch drill pipe at a barrel a minute. The well then cored on, found 8½ feet to 5360.5 feet excellently porous. Seven-inch casing was set to 5352 feet.

# EXPLORATORY FAILURES

### ARKANSAS WILDCATS

**Ashley County:** McAlester Fuel Co.'s Crossett Lbr. Co. B-1, c ne sw 28-16s-6w, abnd 5-26-47 at 3810.

**Lafayette County:** Chicago Corp.-A. E. Stewart's Baker-Strange Realty Co. 1, c se nw ne 1-16s-24w, Nacatoch 1535, Tokio 2570, base Annona 2223, Buckrange 2353, L. Cretaceous 2963, abnd 5-24-47 at 4207.

**Nevada County:** A. F. Weaver-Lloyd Anthony-Cecil Durham's Gurdon Lbr. Co. 1, c ne sw ne 30-12s-20w, Travis Peak 2080, abnd 5-23-47 at 2410.

### CALIFORNIA WILDCATS

**Kern County:** Richfield Oil Corp.'s Berry 1, 30-28s-21e, S. Belridge area, abnd 5-27-47 at 10,030.

**Monterey County:** Shell's Honolulu-Thorup-USL 1, 4-20s-7e, King City area, abnd 5-26-47 at 6777.

**Orange County:** Barnsdall's Capron-Menveg 1, 17-6s-10w, W. Newport area, abnd 5-28-47 at 2823.

**Tulare County:** J. L. Smith & R. H. Larsen's Moore 1, 28-22s-27e, Terra Bella area, abnd 5-26-47 at 1435.

**Ventura County:** Joseph Schuck's 2, 33-2n-20w, Conejo area, abnd 5-26-47 at 670.

Joseph Schuck's 3, 33-2n-30w, Conejo area, abnd 5-27-47 at 220.

### ILLINOIS WILDCATS

**Bond County:** A. Wilson's File 1, se sw ne 21-5n-4w, abnd 700.

**Clark County:** Clarence Fitzgerald's Geff 1, se sw 28-12n-13w, abnd 750.

**Cumberland County:** K. R. Wilson's Monohon 1, sw 10-9n-10e, abnd 1400.

**Edgar County:** Frank Scales' Doss 1, nw 36-14n-13w, abnd 159.

**Jefferson County:** Nash Redwine et al's Meadows 1, se se nw 15-3s-4e, abnd 3195.

Puritan Drlg. Co.'s Woodworth 1, nw nw se 27-2s-4e, abnd 3111.

### INDIANA WILDCATS

**Gibson County:** S. D. Jarvis' Hart Community 1, nw 31-1s-10w, abnd 2124.

S. D. Jarvis' Jones 1, sw ne sw 11-3s-12w, abnd 2648.

### KANSAS WILDCATS

**Butler County:** Bennett & Abel et al's Boyles 1, sw ne se 4-25s-4e, abnd 2787.

**Graham County:** Palmer Oil Co.'s Manny 1, ne ne sw 28-8s-21w, abnd 3760.

**Morris County:** Brazil & Newton's Kurtenbach 1, nw nw ne 19-16s-6e, abnd 2820.

**Sumner County:** D. R. Lock's Potucek 1, ne nw nw 7-33s-2e, abnd 3812.

**Treago County:** Bridgeport Oil Co.'s Egger 1-A, nw nw nw 12-13s-21w, abnd 3887.

**Woodson County:** Ram Rock Drlg. Co.'s Probst 1, se se ne 26-25s-15e, abnd 1406.

### KENTUCKY WILDCAT

**Todd County:** L. W. Spitler's Hurt 1, 12-E-29, abnd 1618.

### NORTH LOUISIANA WILDCATS

**De Soto Parish:** Triangle Drlg. Co.'s J. F. Fisher 1, sw sw 10-14n-15w, base Annona 1959, base Austin 2777, Comanche 2794, Paluxy 3020, abnd 5-26-47 at 4530.

**East Carroll Parish:** Stanolind's Chicago Mill & Lbr. Co. 3, nw 9-18n-12e, abnd 5-22-47 at 3952.

### SOUTH LOUISIANA WILDCATS

**Iberia Parish:** Texas Co.'s Fannie R. Kling 2, nec 28-11s-8e, 1½ mi w Fausse Pt. prod, abnd 5-21-47 at 13,122.

**Iberville Parish:** Gulf's A. M. Cotton et al 1-A, nec 49-9s-9e, 2 mi se Bouillion prod, abnd 5-22-47 at 11,876.

**Lafayette Parish:** S. W. Richardson's A. Brasseaux 1, nec 68-8s-4e, 1¾ mi s Cankton fld, abnd 5-21-47 at 11,510.

**Plaquemines Parish:** S. W. Richardson's Delacroix Corp. 1-A, 1-16s-13e, 4 mi w of Delacroix prod, abnd 5-23-47 at 11,791.

### MICHIGAN WILDCATS

**Allegan County:** S. L. Findley's Stegman 1, se sw sw 32-2n-13w, Traverse 1353, abnd 5-26-47 at 1355.

Ford Oil Co.'s DenBleyker 1, ne se ne 20-4n-15w, Traverse 1458, abnd 5-22-47 at 1462.

W. Spencer Cook's Tead 1, se se ne 2-3n-13w, Traverse 1648, abnd 5-29-47 at 1689.

**Huron County:** Pure's Elftman A-1, w½ nw ne 2-16n-10e, abnd 5-28-47 at 4309.

**Kalamazoo County:** L. C. Green's Sonnevill 1, nw ne sw 10-2s-12w, Traverse 1474, abnd 5-27-47 at 1490.

**Kent County:** Clarence Crawford's Hanna 1, e½ e½ ne 36-9n-12w, abnd 5-29-47 at 2214.

### NEW MEXICO WILDCATS

**Lea County:** Allan Hargraves et al's State-Phillips 1, c sw sw 1-23s-34e, elev 3369, anhydrite 1725, salt 1985-3650, lime 3735, Yates 4028, abnd 5-23-47 at 4455.

**Union County:** Pure's Black Mesa Unit 2, ne sw ne 6-30n-37e, abnd 4-1-47 in granite at 3514.

### OKLAHOMA WILDCATS

**Cotton County:** Anderson Drlg. Co.'s Rhoades 1, se ne se 12-1s-10w, abnd 2510.

Slaemaker & Deener's Bryston 1, se se sw 22-3s-12w, abnd 2001.

**Jefferson County:** Bay Pet. Co.'s Dean 1, nw se nw 34-7s-6w, abnd 2505.

**Seminole County:** Mid-Continent Pet. Corp.'s Loftis 1, ne ne nw 29-7n-6e, abnd 4064.

**Stephens County:** Gulf's Rue 1, nw sw ne 22-1s-4w, abnd 6509.

E. W. Stephens' Berry 1, se ne nw 35-1s-6w, abnd 2502.

**Tillman County:** B. F. Weekley et al's Fox 1, ne ne ne 17-1s-15w, abnd 1592.

### WEST TEXAS WILDCAT

**Cochran County:** Devonian Oil Co.'s Starnes Jr. 1, c sw sw sect 4, Harrison & Brown sur, elev 3753, anhydrite 2370, brown lime 3920, San Andres 4300, Matador lime 5220, abnd 5-25-47 at 5300.

### WEST TEXAS OUTPOST

**Hockley County—Northwest Slaughter:** Geo. P. Livermore's DeLoache 1, 510 out sec lbr 23, Lge 81, Reeves CSL, elev 3644, San Andres 3830, abnd 5-31-47 at 4850.

### NORTH CENTRAL TEXAS WILDCATS

**Brown County:** Jas. L. White-Robt. J. Milligan's Martin 1, 5727 fr swl 9305 fr nwl of A. Arrocha sur 205, Marble Falls 1412, Ellenburger 1610, abnd 4-23-47 at 1790.

**Jones County:** Al. G. Hill et al's Ellis 1, 330 nsl 2200 ewl T&P Ry. 28, blk 15, elev 1703, abnd 5-19-47 at 2462.

Wm. Herbert Hunt Trust Est.'s Camp 1, 8000 nsl 3400 ewl S. M. Hale sur 251, elev 1707, abnd 5-23-47 at 3510.

Exploration Drlg. Co.'s Gabbart 1, 330 snl 1350 ewl Goliad CSL 360, elev 1952, abnd 5-26-47 at 4730.

G. L. Reasor and West Central Drlg. Co.'s Snyder 1, nw ne ne sect 30, Deaf & Dumb Asylum Lands, elev 1585, abnd 5-21-47 at 3745.

### NORTH TEXAS WILDCATS

**Archer County:** Paul B. Scott et al's Taylor 1, 550 e 600 s of swc of blk 139, Harris sbdn, but in blk A, north edge Archer City, abnd 5-9-47 at 1355.

**Clay County:** Continental's Keen 1, 330 snl 990 wel sect 2698, TE&L Co. sur, elev 1098, Bend 5465, Barnett 6114, Ellenburger 6315, abnd 5-31-47 at 6518.

**Montague County:** Lesh & McCall's King 1, 522 ewl 1000 snl Mary Burnside sur, abnd 5-25-47 at 2632.

**Wichita County:** Lamb & Ford Drlg. Co.'s King 1, 150 nsl 1163 ewl blk 64, Red River Valley Lands, abnd 5-21-47 at 2000.

### NORTH TEXAS NEW PAY TEST

**Young County:** Davis & Jennings' Smith 1, 600 wel 330 nsl sect 1365, TE&L Co. sur, offset shallow, elev 1205, Bend 4170, Mississippi 5048, abnd 5-25-47 at 5098.

### TEXAS PANHANDLE WILDCAT

**Collingsworth County:** Union Prod. Co.'s Glenn 1, c sw H&GN Ry. 87, blk 11, elev 2092, abnd 5-28-47 in granite at 4180.

### SOUTH CENTRAL TEXAS WILDCATS

**Bastrop County:** General Crude Oil Co.'s B. S. Moncure 1, 330 fr swl 990 fr sel 301-ac lse, L. Leverence and C. S. Smith surs, abnd 5-21-47 at 3481.

**McMullen County:** Chas. H. Burns' A. G. Dolph 1, 330 fr s&el sw nw sect 5, Shumway sbdn of Shiner Rch, W. McGill sur, abnd 5-19-47 at 1535.

### SOUTHWEST TEXAS-LOWER COAST WILDCATS

**Cameron County:** Goldrus Drlg. Co.-Geo. Echols' Al & Lloyd Parker 1-A, 560 fr nel 690 fr sel 418.97-ac lse and blk 177, Concepcion de Carricitos Gr, abnd 5-20-47 at 10,007.

**Jim Wells County:** Radcliffe & Killam's Wade 1, 2100 s sw alg el fr nly/nec Benito Lopez de Jean Gr, abnd 5-22-47 at 5200.

**Kleberg County:** Southern Minerals Corp.'s T. M. Brookshire 1, 1950 fr nl 3107 fr wl sect 68, blk 6, Kint 4th sbdn Riviera lds, abnd 5-22-47 at 8023.

**Nueces County:** Republic Nat. Gas Co.'s Clara Driscoll Est. 1, 467 fr sl not at ra, 467 fr el 80-ac lse, Jose A. Cabozos sur tr 1, abnd 5-22-47 at 6011.

**Starr County:** Ernest S. Adams' M. M. Garcia 1, 330 fr sl 1850 fr wl sur 956 and 154-ac lse, ne Ross fld, abnd 5-25-47 at 2730.

**Willacy County:** Magnolia's F. Armendaiz 3, 9310 fr nl 4150 fr el BIG sh 4, San Juan de Carricitos Gr, abnd 5-11-47 at 11,000.

### EAST CENTRAL TEXAS WILDCAT

**Freestone County:** C. L. Brown et al's Beasley 1, 447 snl 440 wel 55½-ac tr and J. Trudoe sur, elev 450, Pecan 2640, Austin 3546-3920, Woodbine series 4240, sand 4311, abnd 5-22-47 at 4333.

### NORTHEAST TEXAS WILDCAT

**Bowie County:** Tide Water-Seaboard's Dalby-Joiner 2, 967 snl 330 wel D. Puckett sur, elev 281, Paluxy 4526, Glen Rose 4810, abnd 5-26-47 at 4878.

### NORTHEAST TEXAS OUTPOST

**Rusk County—S. Henderson:** Chicago Corp.'s Morris 1, 467 fr m/n/nwl 667 fr ne of 106.67-ac tr and E. A. Smith sur, 1 mi s of Travis Peak gas disc, elev 445, Pecan 2480-2760, Austin 3185, L. Cretaceous lime 3358, Goodland 4242, Paluxy 4432, Glen Rose 4712, massive anhydrite 6143-6375, Young sand 6478, James 6843, Pettit 7084, Travis Peak 7362, abnd 5-23-47 at 7520.

### UPPER TEXAS COAST WILDCATS

**Chambers County:** Gulf's W. F. Mayes et al 3, 4526.5 fr nl 843.9 fr el C. Blanchet sur, 9200 n of Lost Lke prod, abnd 5-20-47 at 8966.

**Harris County:** Union Prod. Co.'s J. W. Rath 1, fr nwc blk 26 of Geo. W. Harbin acres sbdn (nec W. Sevey sur), go 1400 s th 850 e to lcn in nec blk 35, S. W. Upshaw sur, abnd 5-23-47 at 8500.

**Orange County:** Lloyd H. Smith et al's W. C. Gilbert-L. L. Williams et al 1, w side Vidor Prospect, c nw se sect 38, C. W. Theriot sur (T&NO sect 38), abnd 5-26-47 at 8508.

### WYOMING WILDCATS

**Big Horn County:** J. W. Osborne et al's Kreuger 1, nw nw nw 20-52n-93w, Greybull area, Phosphoria 3333, Tensleep 3500, abnd 5-10-47 at 5528.

**Natrona County:** British American's Unit 1, ne ne sw 27-36n-83w, Natrona, 1st Frontier 3078, 2nd Frontier 3442, 3rd Frontier 3641, Dakota 4410, U. Sundance 4670, L. Sundance 4750, Gypsum Springs 4850, abnd 5-17-47 at 4953.

### WYOMING OUTPOST

**Weston County—Mush Creek:** Platte Valley O&G's Wert 1, c sw nw 5-43n-62w, abnd 5-27-47 at 3649.

## THE OIL MAN'S CALENDAR

| | |
|---|---|
| JUNE 16–19 | ASME Semi-Annual Meeting, Chicago, Stevens Hotel. |
| 25 | Rocky Mountain District API Division of Production, Yellowstone National Park, Mammoth Hotel. |
| 26–27 | Quarterly Executive Conference, Rocky Mountain Oil and Gas Association Directors, Yellowstone National Park, Mammoth Hotel. |
| 26–27 | Kentucky Oil & Gas Association Annual Meeting, French Lick, Ind., French Lick Hotel. |
| AUG. 11–12 | Interstate Oil Compact Commission, Great Falls, Mont., Rainbow Hotel. |
| 25–27 | Annual Appalachian Gas Measurement Short Course, West Virginia University School of Mines, Morgantown. |
| SEPT. 8–10 | Fall Meeting, Petroleum Division, AIME, Tulsa, Mayo Hotel. |
| 13–15 | Annual Meeting, American Association of Oil Well Drilling Contractors, Long Beach, Calif. |
| 17–19 | National Petroleum Association Annual Meeting, Atlantic City, Traymore Hotel. |
| 23–24 | Fall Meeting, Petroleum Division, AIME, Los Angeles, Elks Club. |
| 29–30 | Annual Meeting Independent Petroleum Association of America, Oklahoma City. |
| 28 to Oct. 2 | Regional Meeting, AIME (includes 2-day Petroleum Division Session), Denver. |
| 29 to OCT. 3 | American Gas Association, Annual Convention, San Francisco. |
| OCT. 6– 8 | ASME Petroleum Mechanical Engineering Conference, Houston. |
| NOV. 10–13 | American Petroleum Institute Annual Meeting, Chicago, Stevens Hotel. |

**Nomads Chapter monthly meetings: LOS ANGELES, second Wednesday, Mayfair Hotel. HOUSTON, second Monday, Ye Olde College Inn. NEW YORK, first Monday, Louis Sherry's. TULSA, third Wednesday, Hotel Tulsa. DALLAS, date not yet fixed.**

## MEN IN THE INDUSTRY NEWS

**Earl D. Wallace,** since 1946 vice president in charge of crude oil production, Standard Oil Company (Ohio) has been elected a director to succeed **Sidney A. Swensrud** who resigned to become executive vice president and director of Gulf Oil Corporation.

Earl D. Wallace

Wallace was graduated in 1921 in mining engineering from the University of Kentucky and spent several years with Petroleum Exploration Company and Wiser Oil Company before joining Sohio as land and production manager in 1942.

»

**Richard W. French** was appointed Wallace's assistant, with direct charge of the production department's staff of engineers and Sohio's production laboratory at Oklahoma City, representing Sohio in any over-all research programs. He was with Continental Oil Company for 14 years before joining Sohio.

»

**Francis E. Heath** has been appointed chief geologist of the Dallas division of Sun Oil Company, to relieve **Dr. Frederic H. Lahee** of growing administrative detail. Lahee becomes geological and research counsellor of the production department. **A. S. Rhea,** assistant to Heath, was appointed chief petroleum engineer of the Dallas division. Heath joined the company in 1926 as geologist, moving up through assistant geologist and assistant supervisor of research to chief petroleum engineer in 1940. Rhea has been with Sun since 1927, has served in East Texas, Dallas and Corpus Christi.

»

**Ralph R. Cadenhead,** scout for Magnolia Petroleum Company in the Ardmore, Okla., district has been promoted to landman, and is succeeded by **Ben S. Brooks,** who was transferred from Dallas headquarters.

»

**O. G. Crumpton,** field superintendent for Martex Realization Corporation, has been transferred from Bryson to Wichita Falls to take active charge of the North Texas properties acquired from **Jack Grace** and **Henry Grace.**

»

**G. Herzog** has been appointed director of research of the producing department for The Texas Company. He will be in charge of the Bellaire Laboratories, Houston, where he will have headquarters.

G. Herzog

Herzog originally entered the service of The Texas Company in February, 1940. He received the Ph. D. degree from the Swiss Institute of Technology at Zurich, Switzerland in 1928, where he majored in physics.

**Edward R. Winslow,** formerly office manager for Sun Oil Company at Columbus, Ohio, has been transferred to Baltimore as office manager. He joined the company in 1928. His successor at Columbus is **C. W. Cocanougher,** who came to Sun in 1924 as an auditor in the Tulsa office. **Fred H. Kaye,** office manager at Baltimore since 1944, will succeed Cocanougher at Toledo.

»

**Philip G. Wharton,** vice president and general manager of administrative services, The Atlantic Refining Company, Philadelphia, was named a Fellow in the National Office Management Association at its 28th annual conference, the first petroleum company executive to be so honored. He is currently a director and member of the executive and finance committees of the association.

»

**Fred C. Ripley,** general manager of Chanslor-Canfield Midway Oil Company, will retire from active service on July 1 after having been with the company for 43 years. The first oil well to reach 10,000 feet, in the Rincon field of Ventura County, Calif., was drilled under his direction.

»

**C. B. Sullivan** has been elected a vice president of Republic National Bank of Dallas. He resigned as assistant supervising examiner for the southwest district of the Federal Deposit Insurance Corporation to join Republic's official staff.

»

**Rushton L. Ardrey,** vice president of the Republic National Bank of Dallas, has been elected one of 12 directors of the Bankers Association for Foreign Trade. **P. A. Kinnoch,** vice president of the American Trust Company, San Francisco, was elected president of the Bankers Association for Foreign Trade.

»

**Howard Van Dyke,** editor of The Carter Oil Company's monthly publication, *The Link,* has been elected chairman of the Southwestern Association of Industrial Editors, succeeding Bob Brown of the Morgan Company. Van Dyke resides in Tulsa.

»

**R. D. Copley,** Rocky Mountain assistant production superintendent for The California Company, has been retired after 14 years' Rocky Mountain service with the company.

»

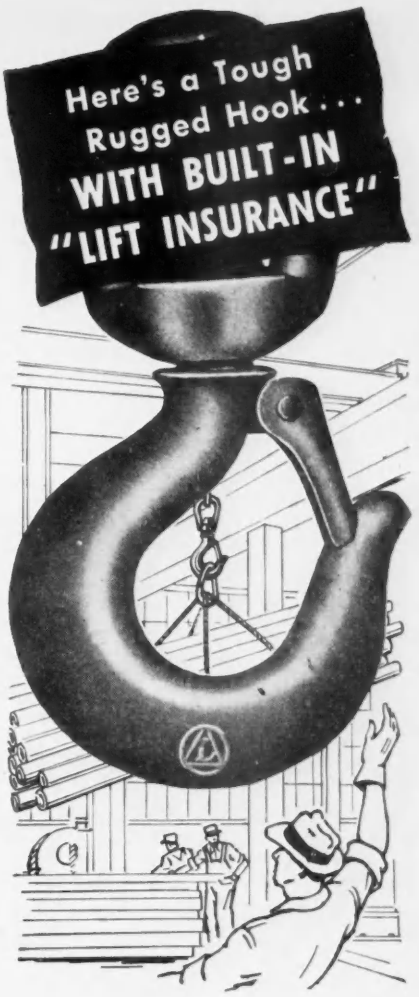
**Eugene McElvaney,** vice president of the First National Bank in Dallas, spoke at the Mississippi Bankers Association convention at Biloxi, May 12-14, on "Oil in Your Back Yard."

»

**H. S. Cole,** Houston; **H. M. Mallon,** Shaker Heights, Ohio; and **G. G. Gabrielson,** New York City, have incorporated the Hydrocarbon Producing Corporation to operate in Texas.

»

**D. F. Woodmency,** formerly station manager for Dowell, Incorporated, at Flora, Ill., left Tulsa to become manager in Eastern Venezuela for United Oilwell Service, S. A. He has had many years' experience in foreign oil fields, including Colombia, Venezuela and the Middle East. His headquarters will be at the field office near San Joaquin.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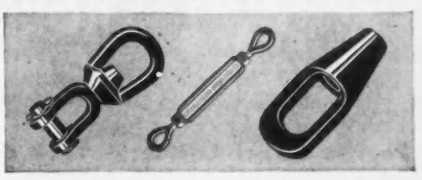

## MEN IN THE INDUSTRY NEWS

**John G. Pew,** vice president in charge of production of Sun Oil Company, who recently moved to Dallas from Philadelphia will be honored June 10 by the Dallas Wildcat Committee with a cocktail party at the Dallas Petroleum Club, this to be followed by a dinner.

**Russell V. Johnson,** consulting geologist, has opened an office at 600 mercantile Building, Denver, Col., for reconnaissance and detailed examination of oil and gas properties.

**George W. Finger, Ray L. Brock** and **J. A. Denny, Jr.,** all of Borger, have organized the Superior Well Servicing Company to operate in the Texas Panhandle.

**Leland Fikes,** Dallas operator, is president of the Jasper Oil Company, which was organized with a Delaware charter to acquire and operate Heidelberg field, Miss., properties recently acquired from Rogers Lacy.

W. C. Lynch

J. W. Templeton

**J. W. Templeton** has been advanced to assistant to the director of production for General Petroleum Corporation. He has been with the company 26 years and has served in various engineering capacities. **W. C. Lynch,** a company veteran of 31 years, was promoted to assistant to the manager of industrial relations. He has headed the personnel department since 1929. **W. D. Joiner, Jr.,** replaces Lynch as personnel manager, having been for the past ten years assistant to the manager of production.

W. D. Joiner, Jr.

**Ernest E. Hitt** was appointed manager of the Denver City, Texas, store of Oil Well Supply Company. He joined the company in 1937 and comes to his new position from Big Spring, Texas, succeeding **B. I. Castle,** who becomes field representative at Odessa.

**C. F. Garlitz, J. N. Mullins** and **J. D. Starr,** all of Fort Worth, have organized the Carter Drilling Company, with headquarters at Fort Worth. The new firm is drilling an Ellenburger prospect in Crockett County sector of West Texas.

**E. A. Waite** has resigned as director of public relations for Standard Oil Company of California. Waite has been with Standard 4½ years, and prior to joining the company was associated with Braun and Company, public relations councilors of Los Angeles.

**W. L. Ingraham** has been appointed to the newly-created post of assistant coordinator of personnel development for Standard Oil Company of California. He will serve with **J. E. Norton,** coordinator, to select, place, train, appraise and recommend key personnel. Starting with Standard in 1928 as boilermaker's helper in the Richmond refinery, he has held positions in organization, marketing and real estate departments.

W. L. Ingraham


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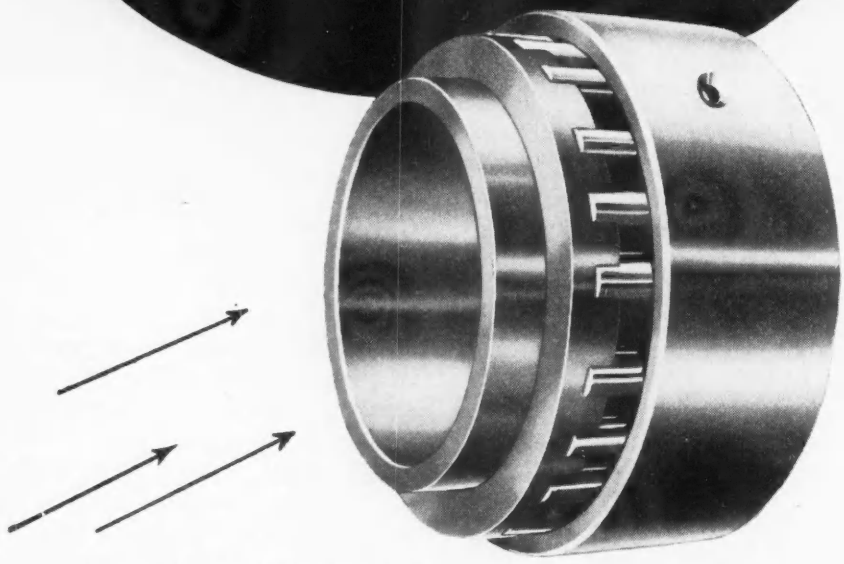

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**A. E. (Chick) Hickman,** Bethlehem Supply Company, has been promoted to district manager of the Texas Panhandle area. He became associated with the firm in February, 1945, as store manager and field representative of the Pampa, Texas, store. Prior to his affiliation with Bethlehem Supply, Hickman was associated with the lumber industry in Kansas, Oklahoma, West Texas and the Panhandle area for 12 years.

A. E. Hickman

»

**H. L. Pehrson** has been named manager of West Coast sales for Ladish Drop Forge Company products with offices at Los Angeles. Pehrson has been associated with the valve and piping business for 16 years with the Reading Pratt and Cady Division of American Chain and Cable Company.

»

**Arthur L. Gardner,** production manager of Monsanto Chemical Company's Merrimac Division, was appointed assistant to the division general manager, **Josiah B. Rutter.** A veteran of 27 years with the company, Gardner will deal primarily with production problems.

»

**John Eckel,** vice president in charge of engineering for Oil Center Tool Company, is leaving soon for a long tour of South American oil operations, including one month in the Lake Maracaibo area. **Val R. Wittich,** export representative for the company, will join him in Caracas.

»

**Joe Larkin** has been appointed chief chemist in charge of rubber research for Patterson-Ballagh, Division of Byron Jackson Company.

»

**E. E. Spicer,** formerly with the Jones & Laughlin Supply Company and associated with the oil industry for the past 15 years, has joined the Mercury Drilling Company, Tulsa.

## Deaths

**H. L. Brelsford,** 46, of Longview, employee of Humble Oil Company for 26 years, died May 29. A native of Gonzales, he spent his youth in Houston, and at the time of his death was assistant division chief clerk of the East Texas division of Humble Pipe Line Company.

»

**Rupert A. Fouts,** 77, well-known Houston oilman, died June 2. He was born in Malta, Ohio, and came to Houston in 1919, where he organized the Deepwater Oil Refining Company, which became Eastern States Petroleum Company upon his retirement in 1930. Before coming to Houston he had been vice president and general manager of the Red River Refining Company, with offices in Chicago.

»

**Walter Samuel Rapp, Sr.,** 51, senior clerk in The Texas Company, by whom he was employed since 1920, died June 3 in Houston.

»

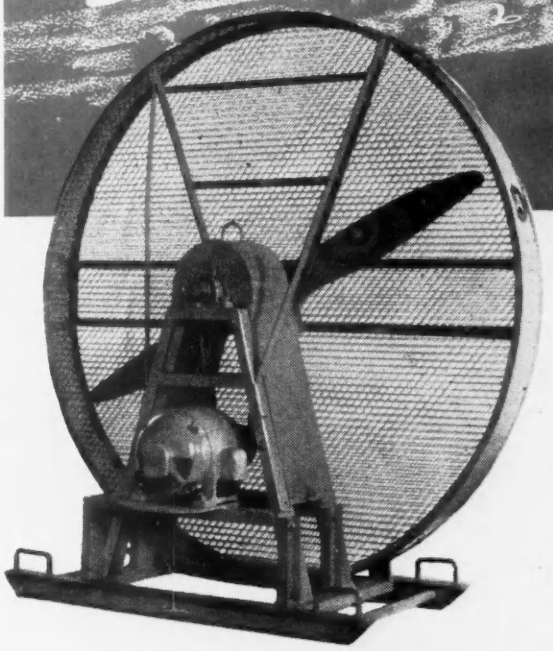
**Grover B. Wise,** 60, North Texas production superintendent for the Walter H. Gant Interests with headquarters at Graham, died May 29 at Fort Sumner, N. M., while en route to Colorado.

»

**Lou D. Ladd,** 63, veteran Fort Worth operator and co-discoverer of the McMillan field, West Texas, died June 1 after a brief illness.


Giant 66-inch BUG BLOWER!

Keeps Insects AWAY! Keeps Crew COOL!



When this giant blower gets going, all bugs, mosquitoes and other insects are soon *gone with the wind!* Here's the sure way to get rid of pests which are such a menace to drilling crews. And at the same time, the increased circulation of air on the drilling floor helps keep the crew COOL! This American Blower has a deep-pitched propeller — entirely enclosed by screen. And because it's mounted on 2-inch "I" beams, its easily skidded into position.

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# MANUFACTURERS' NOTES

## Link-Belt Announces Changes In Chicago Office

The financial staff of Link-Belt Company has been expanded with the appointment of Franklin C. Schimpf as comptroller. His headquarters will be in Chicago. He has been chief accountant of Dodge and Ewart plant operations in Indianapolis since 1937 and assistant secretary of the company since 1942, having joined the company in 1905. Other changes in the Chicago office have resulted in the following lineup of personnel: Harry E. Kellogg, secretary and treasurer; F. H. Brandt, general auditor; M. P. Anderson, assistant treasurer; H. C. Oskrd, assistant treasurer; H. W. Aden, assistant secretary; and C. W. Marum, credit manager.

Link-Belt also announced the reestablishment of a sales office in Washington, D. C., at 1009 Washington Gas Light Building, Eleventh and H Streets, with C. R. Heller in charge. He will work primarily with foreign purchasing commissions and governmental and Armed Service bureaus located in Washington. Industrial sales in the District of Columbia will continue to be handled in the company's Baltimore office.

## Hewitt-Robins Products Again Available

Hewitt Rubber Division, Hewitt-Robins, Inc., announced that Maltese Cross conveyor and elevator belting again is in production after being withheld from manufacture during the war because of government restrictions on the use of premium quality materials.

Before the war, this widely known belting made numerous tonnage records under unusually severe usage in mining, quarrying and similar service.

## New Byron Jackson Plant

**Completed recently and now occupied, a new plant addition of the Byron Jackson Pump Division covering approximately 8 acres on the south side of Vernon Avenue, Vernon, California, supplants the present buildings on Slauson Avenue in Huntington Park, occupied since 1920.**

**Erected at a cost of over $1,500,000 and begun in January, 1946, the new addition includes an administration building, and provides for machine shops, stock room and warehouse, shop cafeteria, service and pattern shops, truck shed, garage and maintenance, and oil and paint storage. All phases of the building operations were under the direction of Floyd C. Merritt, vice president of the Oil Tool Division.**

## Falcon Products Buys Rights From S. & E. Manufacturing

H. F. Schlittler, vice president of Falcon Products Inc., Pomona, Calif., announced the outright purchase from S. & E. Manufacturing Company of its interest in the Greenwood slush pump safety throttle valve and trigger-trip valve. Purchase includes patents, tooling and inventories.

Both the Greenwood safety throttle valve and the trigger-trip valve have long been in operation by major oil companies. These items recently acquired by Falcon supplements the line of Falcon precision-built slush pump liners, sleeves, rods, interlocking rod packing, swivel wash pipe and Greenwood swing check valves.

A Falcon bulletin, No. 102 fully illustrating and describing the Greenwood safety throttle valve and trigger-trip, is available.

## Monsanto Officials Elected

Dr. Charles Allen Thomas, vice president and technical director of Monsanto Chemical Company, was elected executive vice president at a meeting of the board of directors. Felix N. Williams, vice president and general manager of the company's Plastics Division, was elected to the board, who also elected five additional vice presidents: Josiah B. Rutter, general manager of the Merrimac Division; C. A. Hochwalt, director of the central research department; Wm. W. Schneider, secretary of the company and head of the legal department; Daniel M. Sheehan, comptroller; and C. A. Wolfe, director of purchases and traffic.

## *Mission Moves Offices*

The Mission Corporation, one of the largest oil holding companies in the U. S., has moved its executive offices to Reno, Nev., from New Jersey. The corporation holds approximately 60 percent of Skelly Oil Company stock and about 20 percent of Tide Water Associated Oil Company stock. William G. Skelly, Tulsa, is president.

## Continental Supply Sales Men Meet

**The Continental Supply Company held a two-day sales meeting of the West & North Texas & New Mexico district key personnel on May 12-13 at Fort Worth. With R. L. Collier, district manager in charge, the 28 district men were addressed by F. I. Brinegar, executive vice president, N. A. Endicott, sales manager, and J. A. Mussler, manager of tubular sales, all of Dallas.**

## SQUEAKS from the BULL WHEEL

### The Supreme Effort

"Ah," sobbed Fedorova Novopetrovskoe, "Vladmir Ivanovitch is dead! And you say he spoke my name at the last, as he lay dying?"

"Part of it," said Gotyna Lbishechensk soothingly.

### Poet's Nook

A misogynist usually has no wife
And doesn't care for any;
A bigamist is a rover boy
Who's caught with one too many.

### Thumbnail Sketches

He's not very amusing—he couldn't even entertain a doubt.

She's one of God's frozen people.

Another girl we know can be mighty sweet when she wants.

And a lot of them would be more spic if they had less span.

Little Jack Horner sat in a corner . . . (B. O.!)

I'll say he's an optimist—he married his secretary thinking he'd be able to dictate to her.

### And So to Sleep

Angry husband: It's 2 a.m.; where have you been so late?

Wife: I've been sitting up with the sick wife of that sick friend you sat up with last night.

### Not a Joke, Son

A Kentucky Colonel always closed his eyes when he took a drink, and one day someone asked him why.

"The sight of good likkah, suh," he explained, "always makes my mouth watah, suh, and Ah do not care to dilute mah drink."

### Wifey Concurring

Husband: I saw Jack Davis down town today and he didn't even speak. I suppose now he thinks I'm not his equal.

Wife: Why that stupid, brainless, conceited little moron! You certainly are his equal!

### Case of the Drip

Landlord: What are you complaining about now?

Tenant: Well, the faucet won't run, and I was wondering if you would have that hole in the roof moved over the tub.

### Unexpected Payoff

The beautiful thing was lost in wonder over a set of mink skins just presented to her by an admirer. "I don't see," she said, "why such wonderful furs should come from such a horrible little beast."

And he replied, "I don't ask for thanks, but I won't let you insult me!"

### Confirmation

"I always thought you were a gentleman—and now I know it!" she said, as he opened the car door in front of her house at 11 o'clock.

### The Test

Joe: Harry, I find that I'm beginning to talk to myself very frequently. Do you think that I am going crazy?

Harry: (dubiously) well, so far no . . . but do you ever listen?

### Chit Chat

"Her husband didn't leave her much when he died, did he?"

"No, but he certainly left her a lot when he was alive."

### Hopeless

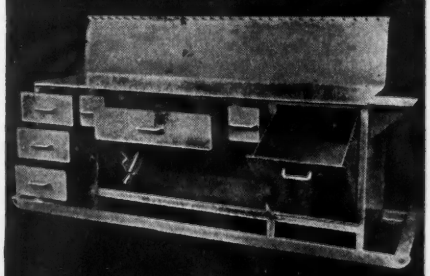
Helen: I saw you with a new boyfriend last night, how is he?

Mary: He's the most trying man I ever met—he didn't even try.

### Mind Reader

He was the owner of a big furniture store in New York to buy some stock, and he met a really beautiful girl in the hotel elevator. But she was French and they couldn't understand a word of each other's language. So he took out a pencil and notebook and drew a sketch of a taxi. She nodded her head and laughed and they went for a ride in the park. Then he drew a picture of a table in a restaurant with a question mark and she nodded so they went to dinner. After dinner he sketched two dancers and she was delighted. They went to a night club and danced and had a lovely evening. At length she asked for the pencil and drew a picture of a four-poster bed. He was dumbfounded. He's never yet been able to figure out how she knew he was in the furniture business.


OWEN



**Type "A" Work Benches**

**Keep Tools Where You Need Them—When You Need Them**

Yes sir, these benches will really pay off when you're in a bind and need a wrench in a hurry. They keep all hand tools within quick, easy reach and prevent misplacement, damage or loss.

Made of heavy steel plate, they're all-welded for strength and drawers are roller mounted for easy operation. There's plenty of storage space for hand tools, grease guns, rags, etc.

Buy one for each of your rigs . . . they'll save time, tools and tempers.

*Sold Through All Supply Stores*

**OWEN TOOL COMPANY**

ROUTE 9 BOX 600-B V-2-4341
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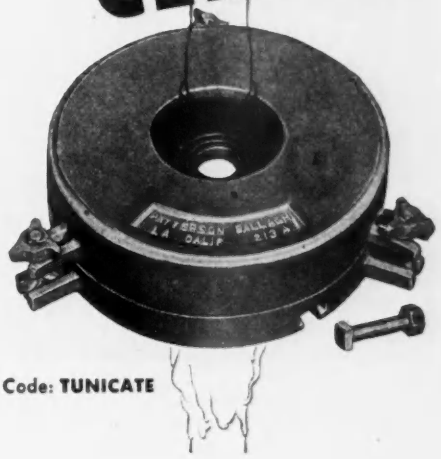
*"Best Bet Yet"*

**TUBING WIPED CLEAN!**



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Wipes tubing dry. No oil to drip on hoist, rig or tools. Rugged alloy steel housing holds free-floating, self-centering, standard Patterson-Ballagh Special Rubber Wiper.

Housing bolts to flange type heads on bolt centers 9 to 16". Tubing spider is set on top of housing which is constructed to take heaviest tubing loads. Three eye bolts, provided with hammer nuts, lock down lid to hold wiping rubber.

Special Rubber Wiper uses same tension principle as Patterson-Ballagh Drill Pipe Wipers. Steel reinforcing ring, molded inside rubber, makes center wiping web flexible, resilient yet firm, durable, and long lasting. Flash-fireproof.

*Order complete assembly by code name: TUNICATE. Wiping rubber replacement, code: WINNOW. Send for Catalog No. 180 or see your Supply Store.*

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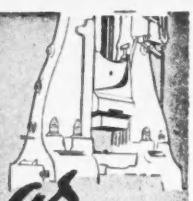

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## Cooper-Bessemer Parts Division Reorganized and Manager Named

Reorganization of its engine and compressor parts division and the elevation of Edward S. Budd to the post of manager of the company's parts division, were announced by Stanley E. Johnson, vice president and director of sales of The Cooper-Bessemer Corporation. Budd also is assistant secretary of the corporation.

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* The asterisk indicates that detailed information on products and services of the firm will be found in current 15th (1946-47) edition of The Composite Catalog of Oil Field and Pipe Line Equipment.

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